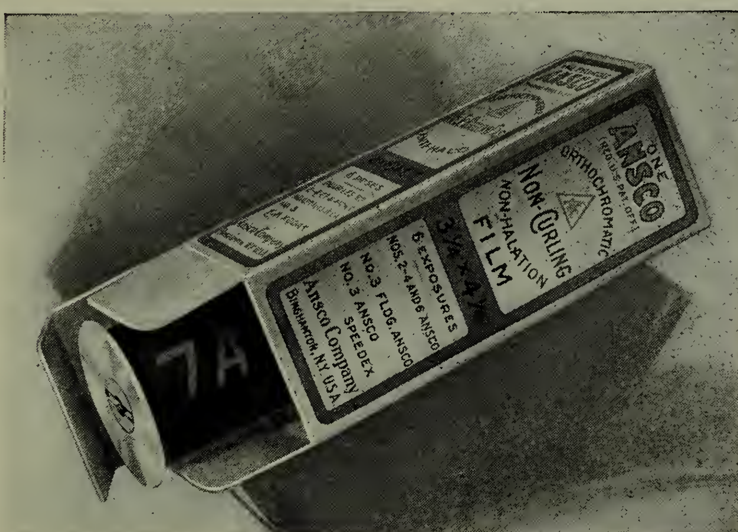
American Annual of Photography

1915

Ansco Film

The article and invention for which many millions were paid as a result of the decision handed down by Judge Hazel, in the United States District Court of Buffalo, which decision was affirmed by the United States Circuit Court of Appeals.



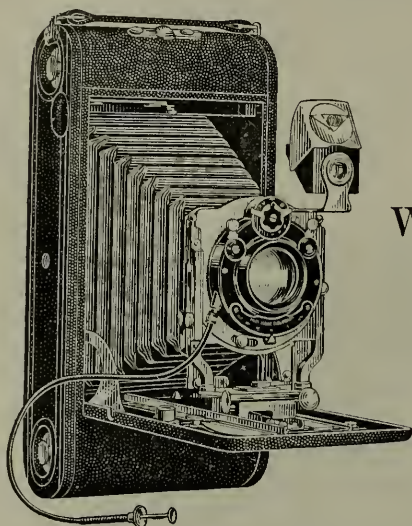
The Ansco non-curling color value film costs no more than ordinary film.

Be sure to load your camera with the original, genuine and perfect film.

Ansco Company

Binghamton, N.Y.

ANSCO SPEEDEX



No. 3A

$3\frac{1}{4}$ x $5\frac{1}{2}$

With Anastigmat Lens

$55.

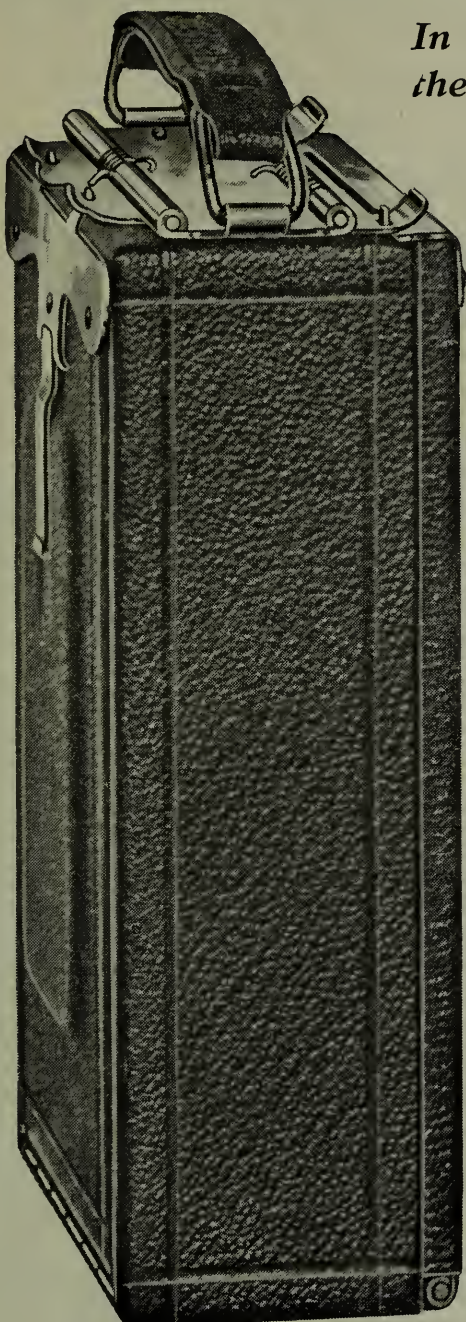
For extra high speed work and for pictures beyond the range of the ordinary camera.

ANSCO cameras are made in 23 different models and sizes.

Ansco catalog with "The Dream That Came True" yours for the asking.

Ansco Company

Binghamton, N.Y.



NOSLIP PRINTING MASK

(PATENTED)

For Printing Film Negatives

The Noslip Printing Mask is the latest improvement in printing masks. It does away entirely with the slipping of the negative when placing the paper in position in the printing frame which frequently occurs with all of the old-style masks. It does away with all bad and ill-shaped edges, leaving a neat even white border all around the print. This mask has pockets in the four corners into which the film is slipped. Full directions with each set of masks. Each set consists of three masks, one for postcards and one each with oval and square opening the size of the negative film.

PRICES

No. 1.	For	2¼x3¼	Film Negative, per set	....	$0.50	Postpaid
" 2.	"	2½x4¼	" " " "	....	.50	"
" 3.	"	3¼x4¼	" " " "	....	.50	"
" 4.	"	3¼x5½	" " " "	....	.50	"
" 5.	"	4 x5	" " " "	....	.50	"

TROX FILM WASHER

(Patented)

This Trox Film Washer is one of the most useful articles for the amateur that we have introduced in some time. It is intended for the amateur who uses the bathroom as his darkroom. Any size roll of film can be placed in the washer. It is fastened by two pins. A rubber hose is attached to the washer and to the faucet of the bathtub, the washer being placed high enough over the bathtub so that the film does not touch the bottom. It is completely washed in a few minutes, as the construction of the washer is such that the water flows over each side of the film its entire length.

Price, 50 cents, postpaid.

GEORGE MURPHY, Inc., Retail Department

57 East Ninth Street **NEW YORK**

Send for New Post Paid No. 14 Mail Order Cash Catalogue

CYKO LINEN WHITE

The American Annual of Photography 1915

VOLUME XXIX

Edited by Percy Y. Howe

NEW YORK
THE AMERICAN ANNUAL OF PHOTOGRAPHY, INC.
MCMXIV

Federal Printing Co., New York

PREFACE

A backward glance at the photographic field since our last issue was published does not disclose any special features of predominating interest.

The photographic business of this country has shown a steady, healthy growth. Probably the most notable feature has been the influx of small foreign cameras, owing to the reduction in tariff.

During the past few months the trade has been considerably upset, due to conditions abroad which have caused a shortage of the standard developing agents of foreign manufacture. We sincerely trust, however, that by the time this issue reaches our readers normal conditions will again prevail, and that the entire world will be at peace.

Both the literary and pictorial work which is here presented has been collected from many sources, and I wish to express my thanks to all who have aided in any way, particularly to those whose contributions I have been compelled to omit through lack of space.

Each reader is invited to contribute to our next volume, either by a manuscript telling of some experience or process in photographic work, or by prints for illustration. These should be sent so as to reach the address given below not later than August 15th, 1915.

PERCY Y. HOWE, *Editor.*

422 Park Hill Ave., Yonkers, N. Y.

TABLE OF CONTENTS

Contributed Articles

Index to Subjects

Index to Authors

Index to Illustrators

Index to Illustrators—Continued

Index to Advertisers

1914

	S	M	T	W	T	F	S
Jan.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	..	..	..	..	..	..	..
Feb.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	..	..	..	..	..	..	..
Mar.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
April	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
	..	..	..	..	..	..	..

	S	M	T	W	T	F	S
May	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
June	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	..	..	..	..
July	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..
Aug.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..

	S	M	T	W	T	F	S
Sept.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	..	..	..
	..	..	..	..	..	..	..
Oct.	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
Nov.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	..	..	..	..	..
Dec.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	..	..
	..	..	..	..	..	..	..

1915

	S	M	T	W	T	F	S
Jan.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
Feb.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	..	..	..	..	..	..
	..	..	..	..	..	..	..
Mar.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
April	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..

	S	M	T	W	T	F	S
May	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
June	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	..	..	..
	..	..	..	..	..	..	..
July	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
Aug.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..

	S	M	T	W	T	F	S
Sept.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
	..	..	..	..	..	..	..
Oct.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
Nov.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	..	..	..	..
Dec.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..

1916

	S	M	T	W	T	F	S
Jan.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Feb.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	..	..	..	..
Mar.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	..
April	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	..	..	..	..	..	..

	S	M	T	W	T	F	S
May	..	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	..	..	..
June	..	..	..	..	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	..
July	..	..	..	..	..	..	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	..	..	..	..	..
Aug.	..	..	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	..	..
	..	..	..	..	..	..	..

	S	M	T	W	T	F	S
Sept.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
Oct.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	..	..	..	..
Nov.	..	..	..	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	..	..
Dec.	..	..	..	..	..	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	..	..	..	..	..	..
	..	..	..	..	..	..	..

THE FLOWER GIRL. *—Copyright, 1914, by Knaffl & Bro.*

The American Annual of Photography · · 1915

BROMOIL

By JOHN WALLACE GILLIES

MANY of the best workers have seen fit to avoid any direct method of enlarging and are making enlarged negatives for the purpose of getting the increased ease of turning out contact prints. While we must give their opinions careful consideration, it might be well to review the other side of the case and see what there is to it.

It cannot be disputed that the ideal manner of obtaining pictures, or say pictorial photographs, is to take out a large camera, say an 8 by 10, and study up on the ground glass precisely what you propose to do, and know that it will look the same as to motif, massing, and placing when the print is made. This, with its big negative, also allows the rendering of the picture in any medium for printing. The enlarged negative also gives certain advantages in ease of printing and selection of papers, for once the enlarged negative is completed, the subsequent turning out of prints is a simple matter.

However there is one notable exception to this rule, in the case of Bromoil vs. Oil, and while many workers seem to favor the Oils, there is a reasonable doubt that the Oils are to be preferred to the Bromoils. It is agreed that if a superior method of obtaining direct enlargements can be obtained from small negatives, a great saving of time, trouble and money will be had, and added to this the convenience of the small camera, such a condition will produce a radically different manner of working for serious amateurs.

The Bromoil process is not advanced as a possible solution of this difficulty, and its limits are fully realized, to the extent that it is not even advised to accept it as a printing medium to the exclusion of any other process. It does, however, possess certain advantages which are not shown by any other process.

It of course, has the advantage of great control, and it is not exceeding the truth to say that the control is practically unlimited in the hands of an expert; but to this must be added that the best prints are made from negatives which are exactly what is desired, and the control should be used simply for the purpose of regulating the tones, planes and other small errors. The quality of the drawing is, of course, different from any other process, excepting always the Oils, and many will enjoy it immensely. It is a curious fact that the best quality of drawing may be had from a fairly sharp original print, though of course the final print is not sharp by any means; prints made from soft focus negatives, used at wide openings, do not seem to work up well, and had better be printed in some other medium. If a soft focus lens is used in making the original negative it is advised that a small stop be used to obtain fair definition, if Oil or Bromoil is to be used.

While much has been written on the subject, I found that it was necessary to get several text books, in order before starting, to get various methods of handling the process, and that much of the text was filled with admonitions, cautions and stock phrasings on cleanliness, and other photographic virtues, and little that tells the beginner how the process may be done simply. I don't mean to say that cleanliness isn't useful in all things, but it hardly seemed necessary to pad up the literature on the subject to the extent that the useful text suffered from it. After a while cleanliness in photography becomes almost second thought, and workers who are likely to attempt any of the more refined processes are very sure to know that part of it.

The usual method of working this process as given by most of the handbooks, is to make a complete bromide enlargement, developed, fixed and washed and dried. This print is then bleached in several solutions, and dried, again. The print is then soaked for a half hour to an hour in water and is then ready for inking. This, to the average amateur, will take

THE CHAPEL. JOHN WALLACE GILLIES.

three nights, and with an allowance of four or five days for the ink to dry, it would seem that it is a long winded process. This part of it I will try to help a little, in order that more can enjoy it.

The negative to be used should be a good firm, medium density and contrast plate; a fairly thin pyro, or a good firm metol-quinol negative will do. This process requires good contrasts, and not a muddy print, for it will be found easier to subdue contrast than to obtain it, as all ink is added to the print and but little taken away. The print should be a good rich bromide, with full contrasts, and such as will make a good sepia by redevelopment though not so dark; that is to say the density shall be obtained by forcing development to a certain extent, and the silver deposit shall extend all the way through the emulsion. A white border should be masked off when printing, say ¾″ to 1″. Any good bromide paper may be used, one of slight gloss being preferable, and strange to say the thin papers have always given me the best prints, though this may be a personal peculiarity.

With the completed print in hand, the first thing to do is to prepare it by bleaching and fixing, for inking. The bleacher which is given below should be used warm and the print left in it until it is fully bleached and then a little longer.

BLEACHER

Copper Sulphate	$Cu\,S\,O_4$	40 grs.
Potassium Bromide	$K\,Br$	40 grs.
Sulphuric acid	$H_2\,S\,O_4$	3-4 minims.
Bichromate of Potash	$K_2\,Cr_2\,O_7$	6-7 grs.
Chrome alum		10 grs.
Water		10 oz.

It is advanced that chemical symbols are advisable in all processes where chemicals are used.

Dissolve the chemicals in the order given, and if doubtful of what is meant by warm, take the temperature and see that it is about 90° F.

When thoroughly bleached, rinse for a few minutes in tepid water, and here might be mentioned that the enemy of the oil or bromoil processes is cold water, as it prevents proper swelling of the gelatine.

ATALA

EDWARD H. WESTON.

Fix in a weak hypo bath, about one oz. hypo to twenty oz. of water for about five minutes. The popular conception for beginners, is that there is a regular railroad timetable for bromoils, which must be followed at all costs, and that to leave it for a moment will spell disaster. This is not so. When fixed, wash for ten minutes or so and if inking is to be done later, the print may be dried by hanging up and inked when seems the best time. Otherwise the print may be soaked another fifteen minutes in warm water and inked immediately. It is not necessary to wash the prints for long, as a reasonable amount of hypo will not harm this kind of a print, though it is not advised to have enough to cause subsequent crystallization.

The print now being ready for inking, it will be noticed that a swelling of the gelatine has taken place, and that the image is plainly visible. The print is now laid on a pad, made from three or four wet blotters, and the surplus moisture is carefully mopped off, until the print is clear of water, and inking may then be done. The handling of the brush is a most difficult thing to explain and I will not attempt it for lack of space. Sufficient to say that the best way is to go ahead and try it, using the popular handbooks for guide until you get on to it. It will seem a hopeless thing at first, then suddenly you will find it out, and immediately will come a good print. It will be well to apply the ink lightly all over the print, and gradually bring the print up to proper density, until the desired effect is obtained. Inking for a 6½ by 8½ print, should take about ten to twelve minutes if a good print is present, and it will be found that if longer than that is taken, the print is not a good one, and you are working to try and save it.

When the print is inked it should be glued by the white edges to an old mount or other stiff board for drying. In this manner it will dry perfectly flat and will never curl. The finished print is a little inclined to be brittle, and this is the best way to dry it. It will be found that the inked print will take from three days to a week or more to dry. So do not cut it away from the mount until you are perfectly sure that it is quite dry, as you will rub the image and then the print is ruined, as retouching or spotting an oil print is difficult.

To hasten drying of the ink, mix with it, what is called

Siccative, by lithographers, and this should cut the time in two.

The ink to be used, is any good stiff litho ink, or better yet the Sinclair ink as supplied by Ralph Harris and Co. of Boston or New York. I dislike very much to use any dealer's name in preference to others, but know of no other dealer that will stock these inks, though there may be several. It will be found that the best color inks to use are black and brown black, or perhaps a deep subdued green, blue black, or Van Dyke brown, though it is advised to stick to the blacks at the start. The brush to be used is a fitch hair stippler cut slanting, a No. 12 will do nicely, and this may be obtained from any paint or brush store, the cost being about $1.10. The foreign brushes may be used, but they are no better and the cost is about three times as much.

CHILDHOOD. GILL & SON.

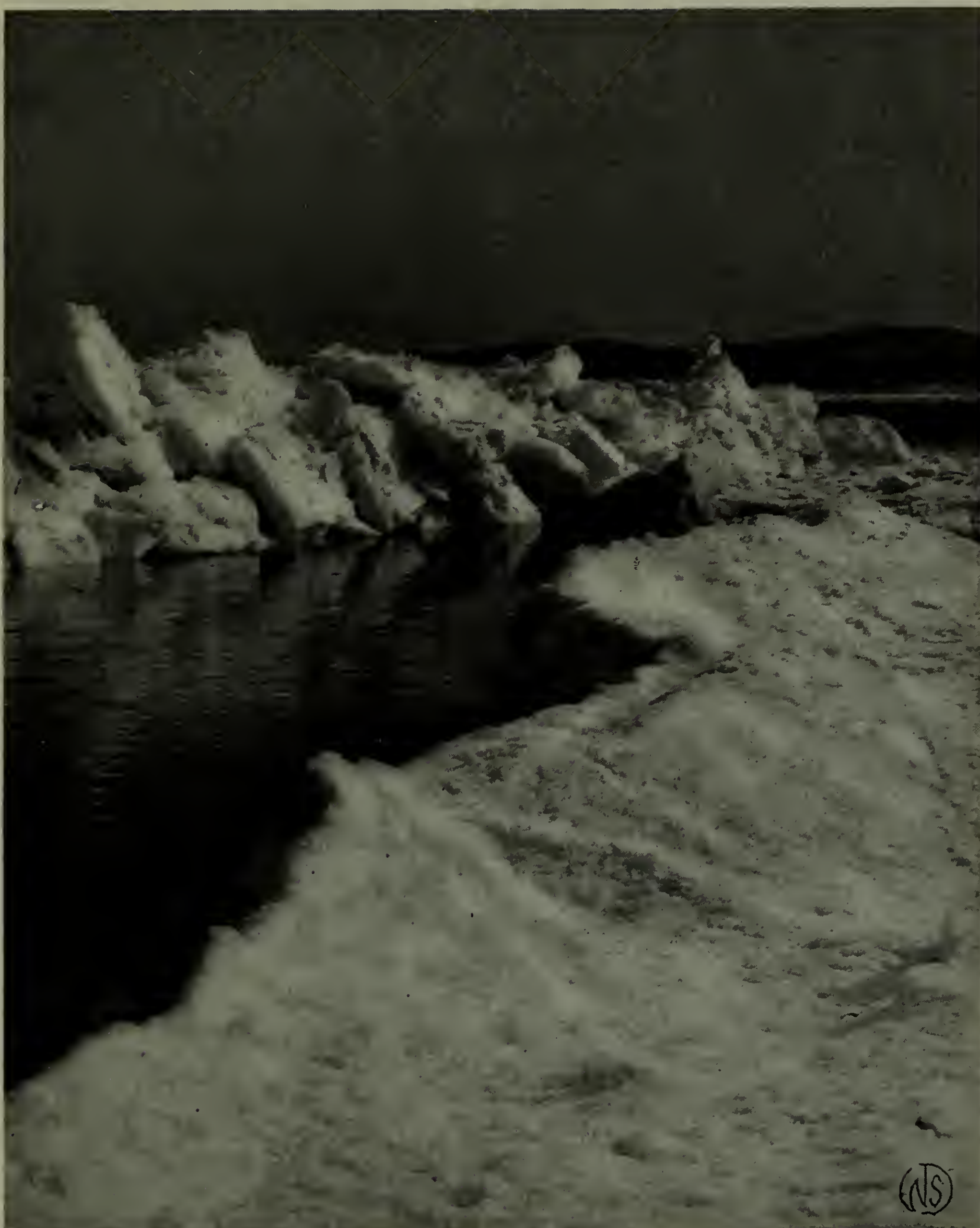
THE BARNYARD.
Illustrating article "Winter Scenes," by William S. Davis.

WINTER SCENES

By WILLIAM S. DAVIS

WHEN winter storms clothe the landscape in a mantle of snow and ice the alert photographer is not content to let his apparatus lie upon some shelf, for, however bleak and dreary the bare fields and trees may have appeared before, the arrival of the snow brings about an enchanting transformation as it spreads out to view in billowy drifts and weaves a pattern of fairy lightness and grace upon every laden tree and bush. So many variations too are produced by changes in lighting and atmospheric conditions that one's opportunities are limited only by ability to see the telling bits here and there and render them in something like an adequate manner.

Some scenes are at their best on a grey day, when the various parts of the landscape form almost a flat mosaic like pattern of but few tones, while in other cases the charm may depend upon the gleam of sunlit snow and shadows cast in just the right place to balance the composition, and as these are constantly moving from morning to night only artistic insight can guide one as to when the psychological moment has arrived.



IN WINTER'S GRASP.

Illustrating article "Winter Scenes," by William S. Davis.

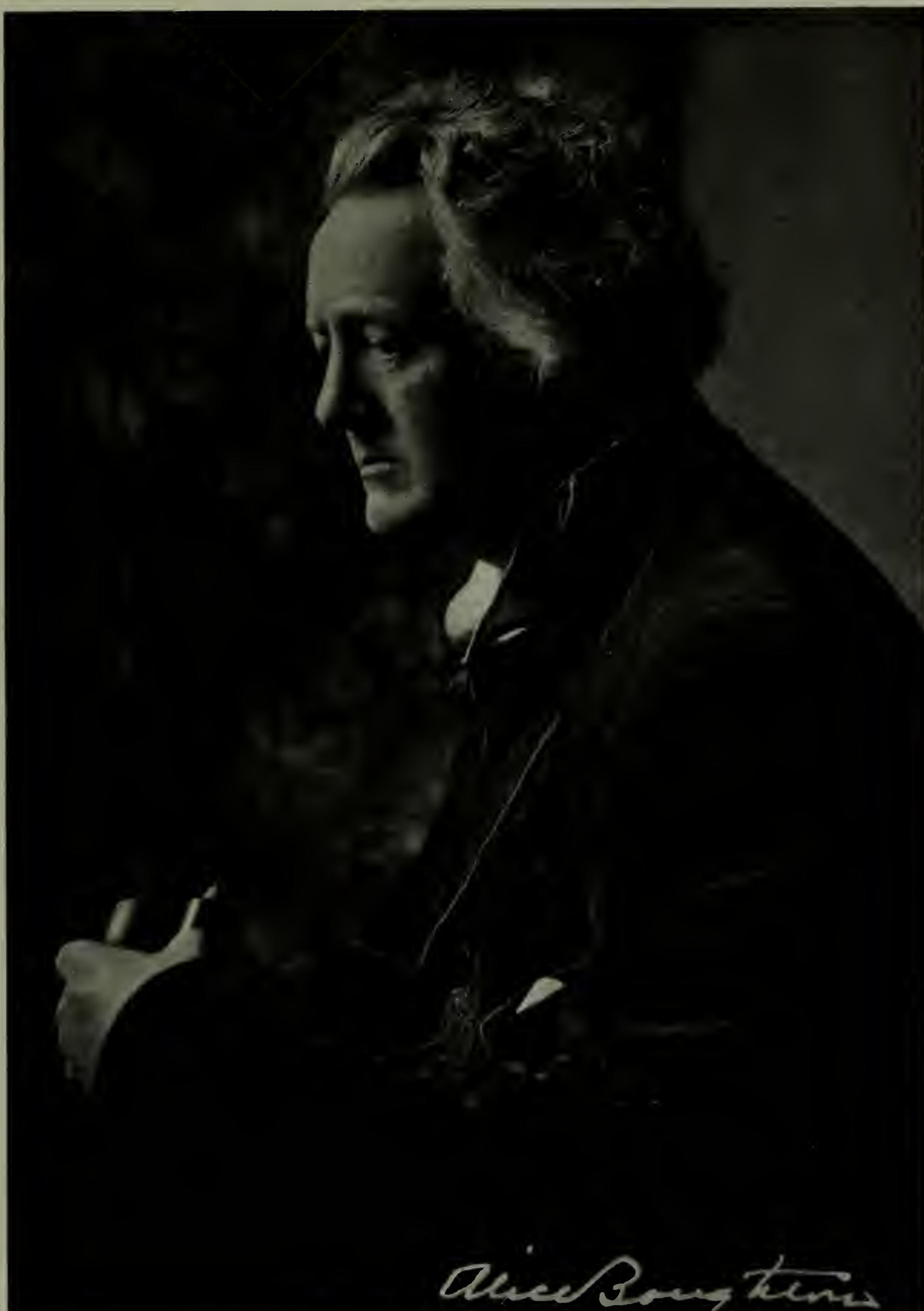
While the presence of snow often transforms a subject otherwise lacking in interest into one possessing great pictorial possibilities, this is no excuse for thinking that the snow in itself is sufficiently attractive to make up for defects in composition and tone rendering.

Owing to the contrasts usually met with, and frequently the disposition of light and dark into small spots, the problem in composition is to secure harmony of both line and tone, and

GREY WINTER.

Illustrating article "Winter Scenes," by William S. Davis.

satisfactory breadth in treatment, without losing the special quality given by the delicate details in various parts. In the case of open views one must trust mainly to broad masses of varied tones, produced by both objects and cast shadows, using such details as bushes etc. only as accessories, which may give character to the immediate foreground. If the snow covered bushes, or tree branches, form the greatest attraction, care is necessary not to include too much, as that would only make the details so small as to cause confusion of lines and a generally weak effect throughout. The beauty of such material is



CHARLES R. KENNEDY. ALICE BOUGHTON.

most interestingly presented by selecting a few boughs or a clump of undergrowth as the main feature, relieved against a simple background of suitable tone.

From the standpoint of photographic technique the great essential is to obtain good tone and color values, for if these are not adequately rendered the impression conveyed by the photograph will be altogether different from what was seen by the eyes. The relative tone values between snow and sky should be especially cared for. This as a rule means the use of color sensitive plates in combination with about a four times ray-filter on the lens, or else some brand of "Anti-Screen" plates, which contain the elements of a filter in the emulsion. Whichever grade is used, however, it is desirable to have them backed or double-coated, so that the longest possible scale of tones may be registered in the negative.

While a good deal has been said about over-exposure, there is really more danger in many cases of under-timing, especially upon scenes containing strong contrasts, for the greater the contrast the more exposure should be given proportionately to the strength of light in order that the shadow detail will appear in the negative before the high lights are over-developed. When suitable plates are used one need not hesitate to give the necessary exposure, for, with a filter to hold back the over actinic colors in sky and delicate snow shadows, the latitude of a backed or double coated plate is sufficient in almost every case to retain the quality of the light portions.

Any developer which usually gives clear soft negatives containing a full range of gradation is suitable for winter views. The main thing is to stop development when the high lights are just strong enough to yield a print with the brilliancy and snap which the subject may require, but free from a suggestion of chalkiness. If the exposure was right the shadows will take care of themselves, having enough detail to make them transparent and luminous in the finished picture.

THE HOUSE BY THE SIDE OF THE ROAD. G. P. KIMBERLY.

THE RAPID DRYING OF CARBON TISSUE

By PAUL L. ANDERSON

THE many advantages of carbon printing are too well known to need recapitulation in the present article, so I will confine myself to a discussion of the methods available for the avoidance of one of the chief drawbacks to this most valuable of all printing processes, namely, the length of time required for the tissue to dry after sensitizing.

All carbon printers are familiar with the fact that the tissue, in ordinary circumstances, takes several hours to dry, so that it is seldom possible to use it on the day of sensitizing, and with the other fact, that unless special precautions are taken a continued spell of unfavorable weather, which would prevent printing for several days, would also spoil the tissue, which, in damp weather, will become insoluble without exposure to light.

The Autotype Company have introduced a spirit sensitizer to overcome this drawback, but this sensitizer has the disadvantage of being rather expensive, and tissue sensitized with it requires, in damp weather, sometimes as much as an hour to dry. Of course, those workers who possess a Cooper Hewitt, or an arc lamp, are independent of weather conditions, but for those who use daylight the ability to print within ten or fifteen minutes after sensitizing is of great value. Therefore, it is my purpose to describe a method which will reduce to a minimum the time that must elapse after sensitizing before the tissue may be printed from, and at the same time to give a formula for a spirit sensitizer which, though inferior to that of the Autotype Company in keeping quality, is less expensive. Satisfactory keeping qualities may, however, be obtained by making up an aqueous solution of the bichromate, which keeps indefinitely, and adding the required amount of alcohol just before use.

The rapid drying of tissue sensitized with a spirit sensitizer depends on two facts: first, that part of the solvent used to carry the bichromate salt is replaced by a volume of a more volatile liquid; and second, that, the sensitizer being more con-

THE FRUIT CART. G. W. HARTING.

centrated, it is not necessary to apply so much of it to the tissue as by the immersion method. Hence, there being but a relatively small amount of water in the tissue, it evaporates more rapidly than would be the case if there were a larger quantity present. Contrary to the usual belief, however, the presence of alcohol or ether does not cause more rapid evaporation of the water itself.

The following formula is that given by the Rotary Photographic Company, and is an excellent one, with the exception that it does not keep for more than a few weeks.

Ammonium Bichromate	1 ounce
Water	3½ ounces
Alcohol (95%)	3½ ounces

It is necessary to use the ammonium salt for the reason that potassium bichromate is not soluble in less than ten parts of water. If it is desired to use a still greater proportion of alcohol, in order that the tissue may dry still more rapidly, sodium bichromate, which is soluble in an equal part of water (one ounce of the salt in one ounce of water) may be used, and the proportions of water and alcohol modified accordingly.

An alternative method of drying the tissue rapidly is to remove the water from the gelatine by means of an alcohol bath, immersing the tissue for some minutes in either wood alcohol, denatured alcohol, or grain alcohol, before hanging up to dry. If this is done two points must be noted, as they are of importance. The first is that it will not do to place the tissue direct from the sensitizer into a bath of full strength alcohol, as the extraction of water from the tissue is so rapid that minute blisters may be formed, and these will not retract perfectly on drying. Hence; the tissue should be squeegeed lightly while resting face down on a glass plate, to remove the surplus solution, and should then be immersed in a solution of equal parts of water and alcohol for five minutes, being then removed for five minutes to a bath of three parts of alcohol to one of water, and being finally placed for the same length of time in a bath of full strength alcohol. If then placed to dry it will be found ready for use in fifteen minutes or less.

The saving of time by this method over the use of spirit sensitizer is not great except in very damp weather. The method depends, of course, on the fact that alcohol has a great

THE FULLER SISTERS. Alice Boughton.

affinity for water, extracting it from other substances very readily. The second point to be noted is that the use of citric acid in the sensitizer is not possible if alcohol is employed, as the alcohol will precipitate the citric acid, so that the use of Bennett's formula for sensitizing is precluded.

Bennett's formula is the best for general use in carbon work, involving the use of citric acid and ammonia, and giving better gradation and purer lights than are obtained with a simple solution of potassium bichromate, but if the tissue sensitized in the latter is dried rapidly the gradation and purity of the lights are better than they would otherwise be, so that when this is done the superiority of Bennett's formula is less marked than when the tissue is dried in the ordinary way.

In conclusion. I would say that my own practice is to use Bennett's formula except in emergencies, as tissue sensitized with it keeps well under pressure for several days, and it is seldom that I am unable to find an opportunity of printing in that time. When, however, it is necessary to print soon after sensitizing, I employ the spirit sensitizer for sheets 11 x 14 or smaller, and the alcohol bath method for larger ones. For the information of those who may not be familiar with it, Bennett's formula is given herewith, in a slightly modified form.

Water .... 30 ounces
Potassium Bichromate .... 960 grains

Dissolve, and add

Citric Acid .... 240 grains

When dissolved, add, a little at a time, stirring constantly

Stronger Ammonia .... q. s. to turn from orange to yellow. The change resulting from the addition of the ammonia is very marked. Add

Water to make total volume........ 64 ounces

The tissue should be immersed for two and one-half minutes, laid face down on a clean glass plate, and squeegeed lightly to remove the surplus moisture, then hung up in the dark to dry.

Most tissues, if sensitized in this manner, are about the same speed as P. O. P., though Ivory Black and the mezzotint tissues are somewhat faster. If hot water is used to dissolve the bichromate the solution must be allowed to cool before the citric acid is added. An equal weight of sodium or ammonium bichromate may be substituted for the potassium salt.

MODERN HIGH CLASS MINIATURE CAMERAS

By CHARLES F. RICE

LIGHTNESS, compactness and portability are cardinal virtues possessed by all small cameras, but only recently have these virtues been linked with the high efficiency of the anastigmat lens. The Modern High Class Miniature Camera is the result. Its capabilities are interesting and significant—yes, more. When the great majority of photographers awake to the possibilities of the short-focus anastigmat lens, the practise of photography is likely to be revolutionized!

Little cameras we have had for many years. Over twenty-five years ago I bought my first camera—a little wooden box that had a ten-cent lens in one end and accommodated a 2x3 plate in the other. This camera had no shutter. The exposure was made with a cap. A pretty poor equipment? Yes, but it would take photographs, and it was as good as anything of its size on the market. Then roll-film came into popularity. Ingenious shutters were invented. Ten years ago the No. 2 Brownie was as good and efficient a camera as could be obtained in the 2x3 size. It used roll film and had a rotary shutter, and in these respects was more convenient and efficient; but the Brownie had an inexpensive lens, too, and the quality of its results was no better than that of the little wooden box of the former period.

Modern high class miniature cameras may be said to be a by-product or after-thought of the invention of motion pictures, for it was the need of the motion picture camera that turned the attention of the lens-makers to the short-focus anastigmat; and the projection of a ten-foot image from the tiny film was a striking demonstration of the possibilities of enlarged pictures from small negatives.

Principally it is the lens in which the little camera of today excels its brother of yesterday. It is not "all in the lens," because without a fast and accurate shutter, the most perfect lens would be at a sad disadvantage; and again, unless the

"Stealing" a picture by taking it at right angles to the direction the operator is looking.

Illustrating article "Modern High Class Miniature Cameras," by Charles F. Rice.

camera, the box itself, is made of durable material, put together right and finely adjusted, the performance of both lens and shutter is discounted.

What are the special virtues of the short-focus anastigmat?

Depth of focus and speed—two of the most desirable qualities in a lens—are both possessed in a superlative degree by the short-focus anastigmat.

Sharpness of detail in both near and distant objects in the one picture—this is depth of focus. It depends on the actual diameter of the lens opening, the smaller the opening the greater the depth of focus, the larger the opening the less depth. Thus a photograph taken through a lens with an opening half-inch in diameter will show a certain depth of focus—regardless of the focal length of that lens, be it two inches or eight inches. But the important point is that speed depends not on the actual diameter of a lens-opening, but on the relation which that opening bears to the focal length. Thus the ½ inch aperture is F/4 in a 2-inch lens, while it is F/16 in an 8-inch lens. F/4 is calculated to be 16-times as fast as F/16. Do you see from this how both depth and speed are combined in the short-focus lens; whereas with the long-focus lens speed may be had only at the loss of depth, and depth may be had only at the loss of speed?

I said before that F/4 is calculated to be 16-times as fast as F/16. This calculation is doubtless accurate in comparing the speed of different apertures in the same lens. But the fact of the matter is, if you are comparing F/16 in an 8-inch lens with F/4 in a 2-inch lens of the same type, you will find that the latter is more than 16-times as fast as the former. Why? Because short-focus lenses are appreciably faster than long-focus lenses at the same relative opening. Again, why? Well, one reason, and the only one I know, is that the short-focus lens has much less thickness of glass, and so less light is lost by absorption.

In much the same way, small diaphragm shutters work more efficiently than large ones—because the shutter blades have much less distance to travel. In practise I have found the indicated 1/300 second with a tiny compound shutter to stop motion as well as 1/600 with either a focal-plane or a multi-speed shutter.

So, you see, as far as impressing the details of the picture on the film is concerned, the short-focus lens and little shutter have every advantage.

But the resulting image is small—almost microscopic in the case of a 2-inch lens.

Enlarged paper positives or positives for projection in a lantern may be regarded as a necessary part of photography with the miniature camera. Here again the fruits of motion picture invention come to our aid with improved and simplified and reasonably-priced projection apparatus. Seriously, I look forward to the time when almost every family will have its own stereopticon, and slides from miniature negatives will be thrown on the screen in lieu of showing an album of prints. Only one person at a time can comfortably look at an album, but a whole room-full of people can enjoy stereopticon views.

Of course, the same projecting lantern that is used for throwing a positive image on the screen can also be used to make enlarged prints on gaslight or bromide paper, from the negative—although for such use it will probably be found advantageous to substitute the camera lens for the one that comes with the lantern. For those who have neither gas nor electricity, there are now, or soon to be, on the market capable enlarging and projection apparatus using alcohol or kerosene vapor lamps.

Just a word as to the quality of enlargements obtainable from negatives made with a short-focus anastigmat. A 5x7 enlargement from a 1¾ x 2⅜ negative made with a 2½ or 3-inch lens will compare favorably with a 5x7 contact print from a negative made with a 7-inch lens, as far as definition is concerned—both lenses being used at the same relative opening. Indeed, I have even made an 8x10 enlargement from a 2¼ x 2¼ film negative that would pass for a contact print from an 8x10 negative. In comparing the prints resulting from such a comparative test, you might well be at a loss to say which was the enlargement and which the contact print, but you would be safe in saying that the one showing the greater depth of focus was the enlargement.

Instead of making enlarged prints by projection, it is an easy matter to make an enlarged negative and produce the final prints by contact. This has always seemed to me a rather

roundabout procedure, but it has certain advantages—it enables the use of platinum, self-toning or other slow-printing papers; and there is opportunity for unlimited work on both positive and negative in the way of retouching and other alterations. In this way I have taken a small negative having an objectionable background and produced from it an enlarged negative with an entirely remodeled and harmonious background.

Under the classification indicated by the title of this article, I would place only those cameras fitted with anastigmat lenses, variable-speed shutters, focusing adjustment, and taking pictures less than 2x3 inches in size. But within these limitations a rapidly increasing variety of apparatus is available. There are roll-film models and plate models. Some have rising front, a few have both vertical and cross-movement, though in more the front is stationary. All are folding cameras, but when closed the lens is covered in some, uncovered in others. Some focus as close as three feet, others only to six feet—the latter depending on supplementary lenses for closer work. Lenses of from 2 to 3½ inches focal length vary in speed from F/6.8 to F/4.5, and F/3.5 in some of the latest models. Prices range from $20 to over $100. The same general specifications apply to the stereoscopic models.

Generally speaking, the various adjustments and fittings that are desirable for a large camera are equally desirable in miniature apparatus. On the other hand, a multiplicity of movements and adjustments leads to complexity and bewilderment —perhaps even more so in small cameras. Even the simpler of the really efficient miniature cameras could hardly be called a beginner's instrument. Roll-film is more convenient than plates even in small sizes, where the weight and bulk of plates do not count so heavily against them; but for careful, precise work plates are better. The lens should be covered when the camera is closed, especially in a camera that is carried in the pocket for quick knockabout use. Movement of the camera-front, either sidewise or vertical, is entirely unnecessary for anything but architectural subjects. For such work an F/6.8 lens is fast enough, and will stand de-centering better than the faster types. For speed-work, or under unfavorable light F/4.5 is not too fast, and will give sufficient depth, in short focal length, to estimate the focus by scale, even as close as

FROM THE METROPOLITAN TOWER.
(Enlargement from 2¼ x 2¼—Note depth of focus.)

Illustrating article "Modern High Class Miniature Cameras," by Charles F. Rice.

three feet. Price is a pretty safe guide to real value, but a $35 camera may suit your particular requirements better than one costing two or three times as much.

What advantages has the modern miniature camera for the amateur—the professional—the press photographer? And what may we expect in the future development of small cameras and their application to various branches of photography?

As an amateur, perhaps my own experience will be of interest. When I bought my first miniature camera, two years ago, my other equipment included several cameras ranging in size from 2¼ x 3¼ to 8x10—some for plates, some for film, some for either. Of these I was using the 5x7 and 3¼ x 4¼ sizes most. A year or two before that, I had rigged up a home-made daylight enlarging outfit, and was gradually using the 3¼ x 4¼ more and more in preference to the 5 x 7, making enlargements from those negatives that were deserving. Since getting the miniature habit, the 5x7 has been practically neglected, being used only for some comparative tests and for a job of copying. Almost all of my pictures of all kinds—landscape, interiors, portraits, action pictures, etc.—I have found I could do as well or better with the miniature camera, or the 3¼ x 4¼, for which I have a special equipment that I will tell of later.

Although I class myself as an amateur—because I do not depend on photography for a livelihood—I have at one time or another been called upon to do practically everything that is expected of the professional. So please consider that I know somewhat whereof I speak when I say that there is very little in professional photography which the small camera with short-focus anastigmat will not do as well as, or better than the more bulky apparatus that is now commonly employed. But the professional photographer is notably conservative and slow to change his methods, and I venture it will be a long time before the little camera comes into general professional use. The professional will not only have to educate himself as to the advantages of the little camera, but he will have to educate his customers as well to the fact that the insignificant-looking little box will "deliver the goods." If I were to engage in professional photography tomorrow, I confess I should have some hesitation in using the little camera for some work, merely on

CONTACT PRINTS FROM MINIATURE NEGATIVES.

Illustrating article "Modern High Class Miniature Cameras," by Charles F. Rice.

this ground that the apparatus looks insignificant and amateurish—even though I were convinced that it would do the work better than a big camera. But this I would do—on every job where a large camera was used, I would make a duplicate exposure with the little camera and show the customer the comparative results. He could choose for himself which was more satisfactory, and I have faith enough in the little camera to believe that it would usually be the winner in such tests.

Press photographers of all men have least occasion, I should suppose, to "bluff" or display imposing apparatus. With them, the less noticeable their camera is the better. Results are what count. For press work the capable miniature camera is the instrument *par excellence*. Press men have already begun to forsake the bulky reflex camera for the handier and less conspicuous scale-focusing camera, and their next step will naturally be the adoption of the miniature. I myself have had experience enough in making newspaper photographs to know that the miniature camera has positive advantages for such work.

What of the future?

I have said that projecting lanterns will come into more universal use. In the amateur employment of miniature cameras the natural result will be this—that many negatives will never be used for making paper prints. A glass or film positive for projection will be made instead. The very latest form of miniature camera (at the time this is written) is intended for just this sort of procedure. It uses motion picture film, and a regular part of the outfit is a projector made to take a roll of positive film. In this apparatus especially is seen the close relation that motion picture invention bears to the development of the modern miniature camera.

Color photography, by autochrome or similar process, finds its most convenient and realistic expression in miniature size—either by projection of single pictures, or in the magnifying stereoscopic arrangement. Those of my readers who have viewed the tiny stereoscopic autochromes know that the illusion is most startlingly real. It is almost as good as looking at the view itself.

Professional photography of the future I am convinced will be done more and more with the short-focus anastigmat, but I

BAPTISMAL FONT.

Example of wide angle work, $3\frac{1}{4}$ x $4\frac{1}{4}$ plate covered by 3″ Dagor F/16.

Illustrating article "Modern High Class Miniature Cameras," by Charles F. Rice.

am frank to say that the present models of miniature cameras —capable and efficient as they may be—are hardly adapted to some sorts of professional work.

For professional photography, my idea is this:

The $2\frac{1}{2}$ or 3-inch anastigmat, with which miniature cameras are fitted, is ideal for professional work, and I believe will do the work better than those lenses of from 7 to 20 inches focal length that the professional now employs; yet the miniature camera itself, the body of the camera, is so very small and slim as to limit its usefulness. For instance, a 3-inch, F/6.8 lens of the best type will cover a $3\frac{1}{4}$ x $4\frac{1}{4}$ plate well. It has no chance to do so, however, if it is fitted to a $1\frac{3}{4}$ x $2\frac{3}{8}$ camera. Extreme compactness is most desirable for the tourist, or for

the amateur who would carry a camera in his vest pocket at all times, ready for instant use. The professional values compactness too, but much of his work demands a certain freedom and latitude of movement that are not afforded by the 1¾ x 2⅜ camera as well as they are by the 2½ x 3½ or 3¼ x 4¼. The lens used must not exceed about 3 inches in focal length, however, or the peculiar advantages of the short-focus lens—depth and speed—begin to be lost.

For my own use in the sort of work that professionals do, I have a 3¼ x 4¼ plate camera fitted with two lenses that are used interchangeably—a 3-inch F/6.8 lens for architectural subjects, wide angle views, etc., and a 4¾-inch F/5.4 lens for portraiture and such things as would ordinarily call for a "long focus" lens. For rapid work in the studio, or in home portraiture—such as child studies, etc.—I believe wonderful things could be accomplished with a very fast lens of short focus, for instance a 2-inch F/3.5 lens, similar to those used for taking motion pictures.

The professional of the future, having adopted the short-focus anastigmat, will use the electric arc enlarger as a regular part of his equipment—perhaps to the exclusion of contact printing, and he will turn out better work than he does now with bulky cameras and long focus lenses. It may be that in professional work, too—as I have predicted for amateur practise—the glass or film positive for projection will supersede the paper print.

Do I see straight from my point of view? If I do, it is not difficult to realize from what I have indicated how far-reaching and revolutionary will be the effect of the short-focus anastigmat, the virtues of which have been made manifest through motion pictures and the modern miniature camera.

Enlargement from portion of Icarette Film Negative.
Illustrating article "Modern High Class Miniature Cameras," by Charles F. Rice.

CRYSTAL OF SAL-AMMONIAC.

Illustrating article "Illumination in Photo-micrography," by Walter Bagshaw, F.R.M.S.

ILLUMINATION IN PHOTO-MICROGRAPHY

By WALTER BAGSHAW, F.R.M.S.

IN the matter of illumination the landscape photographer is at a distinct disadvantage when compared with workers in other branches of photography, for he has absolutely no control over the lighting of his subject. True, he can select the time of year and the time of day most likely to yield any desired pictorial effect, but he must be a man of leisure if able to avail himself of every fitting occasion, and even then, if the scene of his operations be at any distance, probably by the time he arrives at his destination the climatic conditions may be completely changed.

The selection of light and shade, equally with the choice of point of view, makes all the difference between one photog-

rapher and another. The one with knowledge, taste, and opportunity, probably gets on every occasion a real picture, whilst a snap-shotter in the ordinary way gets merely a photograph of some kind.

Portraiture by daylight, however, in a well equipped studio, gives the operator a chance to model his sitter as he pleases, and in this respect the conditions follow more closely those under which a photo-micrographer works when using artificial illumination.

Photography through the microscope, of course, can be done by daylight by means of a heliostat, and indeed some of the best known American workers achieved most successful results when using this instrument; but it is only suitable for a specialist and not to be recommended for ordinary use.

Apart then from sunlight there are many other sources of illumination, most of which are efficient for all purposes. Artificial light has this decided advantage that being more constant than daylight it follows that exact exposure may be repeated successfully as often as required.

Probably for mere visual inspection of an object almost any kind of light will do, though even for this purpose the best effect cannot be obtained unless certain conditions are fulfilled. Defects not so readily observable by the naked eye are accentuated and made clearly visible on a photographic plate, so that the art of illuminating an object properly is one that must be learned before one can hope to secure good negatives.

The risk of failure may certainly be reduced to a minimum if only thorough familiarity of one special illuminant be acquired and results be tabulated for ready reference.

The man who is always changing his methods is not as a rule either able to satisfy himself or to produce a creditable output; therefore it is not advisable to try every kind of light and every brand of plate or paper before settling down to steady work.

In selecting a radiant the chief thing to be considered is that the light shall be steady and of the same illuminating effect at all times. The length of exposure may be shortened or lengthened by use of a more or less intense light, always remembering that the more intense the light the more the trouble from heat and other dangers.

BELL CORALLINE OR CAMPANALARIA.

Illustrating article "Illumination in Photo-micrography," by Walter Bagshaw, F.R.M.S.

Theoretically, the source of light should be a mere point and consequently of great brilliancy, but for very transparent objects a less luminous source is even an advantage.

Bearing these conditions in mind the reader may decide according to the circumstances of his environment which lamp to adopt.

If electricity be available it offers everything necessary. Lime-light is good but troublesome. Acetylene gas is easily worked and satisfactory. Incandescent gas, or a well made incandescent spirit lamp with inverted mantle, is convenient and powerful. Magnesium wire answers well for short exposures, and instantaneous photographs of living animalcule, &c., may be taken by flashlight.

Nothing has been said so far of paraffin oil, about which authorities differ very widely. Some go the length of con-

DRILLING. LEWIS J. FITLER.

demning it altogether, but in the writer's opinion a good oil lamp is the most convenient and best for anyone who has to work at irregular and intermittent times. It can be started at any moment without preparation and will perform excellently with high or low powers, whichever may be employed. In fact negatives from the most difficult test objects can be secured that will compare favourably with those taken by any of the lamps previously named.

Assuming that preference is shown for any special lamp, the next desirable thing is to use it under different conditions. So many people fail to take advantage of the varied methods of illuminating an object under view that much of the usefulness of a microscope is lost, and the owner fails to grasp the immense possibilities of other systems than the one to which he confines himself.

For instance, take a simple transparent crystal with polarizing properties and view it under direct or transmitted light. Its configuration is certainly visible, but no adequate conception of its inherent beauty can be obtained from such inspection. Now add a polariscope to the microscope and instantly what was as uninteresting as a piece of plain glass becomes arrayed in gorgeous colour, ever varying in beauty as the prism is rotated on its axis. Parts are differentiated in brilliant colour that before were absolutely invisible.

Next try the crystal with dark ground illumination. Here again it presents a fascinating sight like a flashing jewel on black velvet. Either a spot lens or a central stop in the condenser may be used for this purpose, or even swinging the mirror to one side and throwing oblique light will give the effect.

Further, the object may then be put under reflected light when it will again present a totally different appearance. If now a combination of transmitted and reflected light be tried the crystal will stand out in bold relief and offer noteworthy points for observation. Yet after all these experimental alterations the microscopist is not at the end of his resources. He may insert multiple colour disks in the condenser and so have the crystal one colour with a background of any other colour he pleases. Other advantages probably may be obtained by the interposition of colour screens or light filters.

Of course, not every object will allow of all kinds of lighting but most will stand several.

It is not within the scope of the present article to explain the modus operandi of alternative methods, which however may be learned from most text-books, but perhaps enough has been said by way of suggestion to induce some owner of a microscope to test more fully the capabilities of his instrument.

A CHILD STUDY. ARTHUR DARIN.

COLORED REPRODUCTIONS

By JOHN LEWISOHN

THE difference between pictures in various colors and pictures in monotones, is like day and night, and while the nights are beautiful in their own way and calm the senses, the same as the effect of monotones, the days are exhilarating and full of life and such are also pictures in colors. It has, therefore, always been the endeavor of photographers to produce pictures in colors and having that same object in view, I have invented and patented a new method of making colored reproductions with the aid of photographic prints, which I will herewith describe:

My first endeavor is to obtain an ordinary silver emulsion negative of an object with preferably as correct color values as can be obtained with the means employed for this purpose, such as orthochromatic plates with suitable yellow color-screen. From this a blue-print is made containing correct color values of the colored object to be reproduced. This blue-print is the basis for treatment for the final colored picture. The blue of the blue-print is used as one of the three primary colors (blue, red and yellow) which form the basis for all the colors of the spectrum, while red and yellow are applied in the form of color-washes for which I have preferred to use solutions in water of the aniline dyes red, eosin and aurantia, respectively.

The blue-print containing the correct color values of the colored object photographed is washed with the yellow wash over those blue portions which are to reproduce the green portions of the colored object, while where purple is required, the red wash is applied over the blue. Where the picture is to be blue, that blue portion of the blue-print is not treated at all and remains as it is the same as in the white portions, which are to remain white. But where pure red or yellow is required the red or yellow washes are applied to the respective white

BELLS. Kate Smith.

portions of the blue-print, and finally both red and yellow color washes may be combined with the blue and result in practically black.

The color washes instead of being applied locally can also be used as a bath for the entire blue-print and in that way can also give different color-effects on the blue-print. Should it be required to bleach part or all of the blue-print either partly or bleach out the blue entirely, this is done with a weak solution of Nitrate of Silver either before or after the color washes have been applied. If after, it fixes the colors at the same time of bleaching the blue. On the other hand, after the blue has been bleached, if for any reason any part should want to be restored to blue, or if the original blue of the blue-print is to be strengthened and darkened, a dilute solution of Ferric Chloride is employed.

It will be readily seen that the lightening, bleaching out, or darkening of the blue together with the red and yellow color washes employed will be productive of innumerable combinations of colors and shadings and give a wide field for the result to be attained. Furthermore, this process, besides being applied to the reproductions of colored objects, can be utilized for the production of any kind of fancy colored pictures and is, of course, not limited to blue-prints on paper, but for instance on woven material or transparent material, etc., in short on anything where a blue-print could be produced.

To illustrate this article without showing the actual pictures, I will enumerate some of the many subjects that I have and that can be pictured in colors: landscapes, seascapes, trees, flowers, leaves, fruits, furniture, bronzes, carpets, hats, dresses, materials like silks, woolens, different kinds of woods, stone, dress apparel, portraits, miniatures, copies of paintings, bric-a-brac, lantern slides, transparent pictured lampshades, and other transparencies, also designs for advertisements, lithographers, magazines, wall papers, ribbons, patterns for dress goods, decorators, colored windows, etc., in short for anything where a colored picture is desired. Of course, pictures are better seen than described.

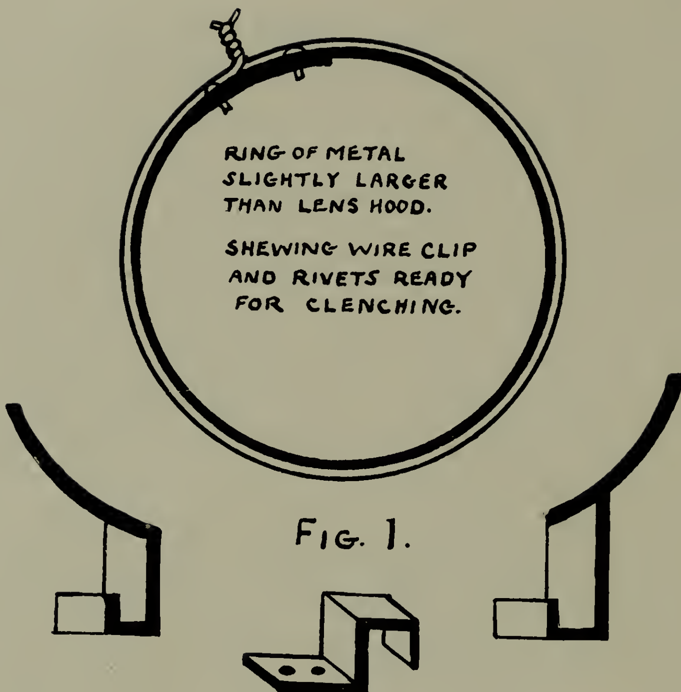


Figure 1.
Illustrating article "An Efficient Filter-Holder," by A. L. Hitchin.

AN EFFICIENT FILTER-HOLDER

By A. L. HITCHIN

HAVING a number of pieces, of different grades, of Wrattens Gelatine Filters it occurred to the writer that binding them, like a lantern slide, between two pieces of patent plate glass would not only make them easier to handle, but also make them practically indestructible.

The Filters, after binding, have been used on all classes of subjects, without ill-effect due to the use of a non-optically worked glass.

As some of the filters were for a 10 x 12 lens, and were 3¼ inches square, it was not possible without inconvenience in use, to use the same holder for the quarter-plate ones, which varied in size.

The following account of how two serviceable holders were made may be of use.

The larger one, (Figures 1 and 1a) it will be noted, is the more simple in construction, and this form is recommended, unless the reader is specially skilled in metal working.

The work will be simplified by first making all the parts of the required size in thin cardboard.

A strip of copper or brass of 18 or 20 gauge for the large

Figure 1a.

size, or 24 gauge for the smaller one having been procured, a piece is cut from it sufficiently long to go around the lens hood, allowing ½ to ¾ of an inch for lapping, and a full 1/16 of an inch play for a piece of ribbon velvet, which is glued on the inside of holder after the metal is blackened.

When the metal is bent in the form of a circle, a piece of wire should be twisted round it to hold it securely whilst the drilling and riveting is done. Small copper rivets may be obtained from an art-metal worker, or, failing these, ordinary

household pins, cut short, may be used equally well. After riveting, the joint should be soldered to allow of filing to the single metal thickness; this should be done both inside and outside.

The next stage consists of bending three pieces of metal as Figure 1 which will be more easily followed than a written description. These pieces are then riveted and soldered on the ring and the edges filed smooth.

The second holder (Figures 2 and 2a) which is an extending one, is made rather differently, but will be understood from

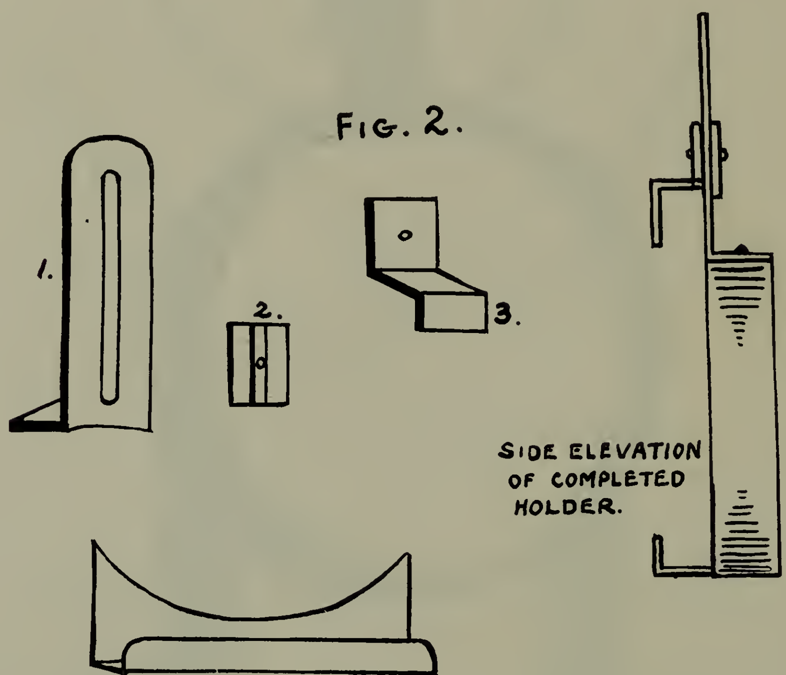


Figure 2.

the illustration. A ring of metal is made as previously described, and the lower clip made in one piece and afterwards soldered to the ring.

The top holder is made of such a length as will allow of the different-sized screens being used, and is slotted for this purpose. The clip for this portion has a piece of metal soldered on the back which slides easily in the grooves, or this small piece of metal may be fixed on to the small retaining piece at the back of the slotted piece. The former is preferable. The top holder is now fixed in position by riveting loosely on the back the small retaining piece.

The work has now to be blackened, and this may be done chemically, or by the use of one of the dead-black varnishes sold by photographic dealers. The former is the more lasting and does not chip off in use.

The blackening solution given in the British Journal works very well; it is as follows:—

Copper nitrate	200 grains.
Water	1 ounce.

Place the holder, perfectly cleaned, in the solution for a few moments, heating it on removal. If not sufficiently blackened, repeat.

The final stage is now reached, which consists of glueing on the inside of the ring ribbon velvet of the required width; this gives a grip, and prevents the lens hood being scratched.

Figure 2a.
Illustrating article "An Efficient Filter-Holder," by A. L. Hitchin.

POSTAL PORTRAITS—WHY?

By JESSIE ROBINSON BISBEE

THERE is a common saying "Once a photographer, always a photographer." In the wonder of the science and in the beauty of the art of photography there is a fascination to all who seriously study it. The history of its development and the possibilities of its future are interesting alike to chemist and artist.

Experiment gives us knowledge, creation gives us joy, but the fact remains that we are in the business for a profit. We might always choose photography as a pastime or a hobby, but there is but one reason for our maintaining public studios, namely, to make money. If we were suddenly to become millionaires tomorrow, it is hardly likely that we would face all weathers at eight in the morning, or that we would be willing to remain at the studio until midnight during busy seasons.

Since we are in the business for the money, it is important that every department of our studios shall certainly and constantly contribute its share to our bank accounts. In order to determine if this is true, it is imperative that each photographer should keep accurate accounts of the income from the various lines of his business and the expense of maintaining each department. There are many systems but surely anyone with sense and initiative sufficient to make good pictures can invent his own cost-system by which he can easily record the cost, or the profit, of a given thing and quickly refer to the data.

There is many a photographer who does not know the cost of his ordinary sitting; he does not know the cost of the cheapest sitting in his studio. I have heard some photographers try to furnish figures from memory, and they are forced to admit that they sell some pictures for less than the cost of production. Two of the best photographers I ever knew from a technical standpoint kept such indefinite records that neither could tell even approximately his volume of business for any year.

INTERESTED. O. C. CONKLING.

If the business of the studio is run on this chaotic basis, it is probably not surprising that so many photographers persist in making postal portraits. I am not speaking of the Finish-While-You-Wait men; nor of the summer-resort or beach postal-car; nor of the carnival tent with its clarion call: "Have photos taken, all ready folks"; nor of the city postal-studio where portraits are made on postals only. Postals are appropriate in these places and it is natural that such photographers should push their use. I am glad to see these men make money —I know of one who is clearing $4000 a year in a carnival circuit—and I can see why they consider the post-card a boon to the photographer.

These various and varied picture-places are in no sense competing with permanent and regular studios, and few people who will pay good prices for their photographs ever seriously consider the three-for-twenty-five portraits. If they do order them, it is in much the same spirit in which they buy peanuts at a menagerie, or a toy balloon on circus day. Postal portraits are logical under these and similar conditions and utterly absurd under other circumstances.

There must be all grades of photographs just as there must be all kinds of food. However, I never knew a five-cent lunch and a four-dollar dinner to be served at the same time from the same table; but I have seen photographers display in the same studio prints at thirty dollars a dozen and postal portraits at fifty cents a dozen! Here is where the inconsistency lies; there is no reason why portraits may not be made on postals in a post-card studio, but there is every reason against their use where better and higher-priced pictures are made.

I say this advisedly after much thought and wide observation, although I must confess that in the folly-book of our studio, where are written the things which we recognize as mistakes, the chiefest sin of all, we think, is acknowledged in this line: we once made postal portraits. Every studio, big and little, within two hundred miles of us, welcomed postal sittings. But we finally felt humiliated every time we made such exposures. The munificent price of a dollar and a half, or two dollars a dozen, is not an inspiration for thoughtful, thorough work. We believe it is not only unpardonable but foolish to do careless finishing on even a postal. The studio which has a

THE OLD WILLOW. Rupert Bridge.

good past record and expects a long future in the location can not afford hurried and cheap workmanship. Here, then, is the situation: if we put time, thought and care into the postal sittings, we produce a picture which should sell at a much higher price than a post-card will ever bring. If we neglect ever so little the postal customer, we not only jeopardize the standing of the studio, but we allow ourselves a lower ideal—we become satisfied with less than our best efforts.

It goes without saying that we never had made anything but small heads on postals, never filling the card; we never had taken group sittings for postal use; we never displayed postals in the show-case or in the studio and we showed postal samples only upon the request of the customer.

We decided that we would gradually work out of such sittings without taking a definite stand against them. We found this: the postal business in connection with other portraits is like a case of blood-poisoning; it requires radical measures. There is only one way to discontinue postal portraits and that is this: Stop Making Them. We stopped.

Far beyond our most sanguine expectations we found true all the good things we had hoped for. We had felt that, reasonably, most customers who ask for post-cards are prospects for something better. As long as postals are made in the studio, it is a delicate and difficult thing to get a better order from such people. But the simple statement, "We do not make post-cards", paves the way for the showing and considering of other work.

Since we discontinued postals, we have kept a faithful record of all the sittings we have lost each year and of sales which have resulted from postal inquiries. We have sold fifteen-dollar photographs to people who said positively that they would have only postals made today. We have made many sales of eight and ten dollars a dozen to people who were fully decided upon postals when they entered the studio. We know that if we had been making postals we would have lost most of these better orders, for the most earnest and skillful work in the reception-room can not often efface the inevitable postal sample when once it has been brought to light.

It is true we lose some sittings entirely. It is true some people have been offended. But the financial gain has been far

above our most optimistic estimate. It is not the number of sittings but the kind of sittings which make the good yearly average. Then there is another view-point. Some who left us last year in search of postals remind us of it this year when they sit for high-priced work. Often we hear something like this: "We do not have big pictures made often and we thought we would rather pay a little more and get the best." Now, our work is probably but little better than it was when these people looked at it before; the change has been largely in their own attitude; intuitively and unconsciously they have reasoned that good results and postal prices seldom go hand in hand.

We have often heard photographers say: "I don't like to make postals but I have to do it; there is a demand for them and all my competitors make them." If we were to advise in this event, we would say: Forget about your competitors; they are not paying your bills, so why should their standard indicate yours? Do what you think is best and right for your own studio. But if once you take the stand, do not alter your decision for your dearest friend or your best customer.

People come into our studio with Seavey Window lightings and Fire-lights on postal cards. For the cheapest and smallest of either style we get ten dollars a dozen; but we are certain that we could not make either for these people at this or a greater price if we would duplicate the postals which they bring for our inspection. There are compensations, you will find, even if you do lose a few sittings. There are many times during the year that you will say with real thanksgiving in your hearts: We do not make post-cards.

Seriously, it is the fault of the photographers of the land that postals have usurped so large a corner in permanent studio work. It is not the man on the sight-seeing car, it is not the travelling photographer, it is not the regular post-card studio which hurts our business. Postals made in these places matter very little, but postals made in our own studios do injure the average studio and only the photographers are to blame.

We, as photographers, have made the way to cheap pictures so easy and so plain that our customers simply must take advantage of it. One studio will make splendid three-quarter or full figure poses on post-cards and the studio just around the corner will gladly supply folders for thirty-five cents a dozen!

Now any customer can mount a postal in a slip-in folder and here is the result: she has secured a panel cabinet for something like two dollars a dozen; at the very studio where she sat for postals, practically the same size, folder-mounted, would have cost probably six dollars a dozen; she has saved four dollars at the expense of the profession and we photographers have taught her this economy.

There are communities today where anything less than a 5 by 7 is called a post-card by 95 per cent. of the customers. One photographer, who could not sell small black and white prints mounted in any style for more than three dollars a dozen, found that he could get eight dollars for the same thing in sepia. Why? Because the average postal is black and white and people do not stop to reason about an extra three-eighth of an inch. I have even heard children say of 11 by 14 prints: "Why, what nice, big post-cards."

We hear on all sides, "Oh, the postal has come to stay." It has come to stay, indeed, unless every photographer finds himself regretting to face this question: What part have I had in impressing post-cards, post-cards, post-cards upon the public mind?

Let us write above our work-room doors: Good work and good prices, now and forever, one and inseparable.

WILD GRAPES HEADING. NATHAN R. GRAVES.

AN INEXPENSIVE PORTABLE LENS SHADE

By JOHN BOYD

THOSE who practice photography, and who wish to be prepared to make exposures at all hours, irrespective of the position of the sun, will find a lens hood or shade of inestimable value.

Better negatives are obtained by its use even when the sun is at one's back, but it is when we are compelled to make exposures with the sun facing us, or at right angles to the lens, that we will appreciate its full worth.

The old way of getting a friend to hold his hat to shade the lens; sticking up an umbrella, or even using the slide from the plate holder, may answer the purpose, but if your experience has been the same as mine, you will find many of your choice negatives show part of these devices along with the view.

The device that I have worked out, and which is here offered the fraternity, is simple, inexpensive, compact and easily applied.

Go to any ten cent store, and buy one of those portable drinking cups made of tin or aluminium. They are made in several sizes, and can usually be gotten to fit any ordinary lens. Select one whose second section from the bottom is the size of your lens or slightly larger. Remove the bottom section of the cup, and fit the next section to go over your lens. Should this be too large, stick passe partout binding inside, until you make it the right size. The balance of the cup can then be given a coat of dull black paint inside, or it can be papered with dull lantern slide strips. This is necessary to prevent reflection.

You now have a collapsible hood that is worth dollars, and which ought not to cost you much over a dime.

IN ROSE TIME. MATHILDE WEIL.

THE ADVANCE IN HOME PORTRAITURE

By W. C. SOUTH

WHILE home portraiture is not a new art by any means, it is only in the last ten or fifteen years that it has been practised extensively. It will not be many years before this method of portrait photography will supplant the studio. At the present time nearly every live studio includes among its outfits one specially set aside for home portrait photography.

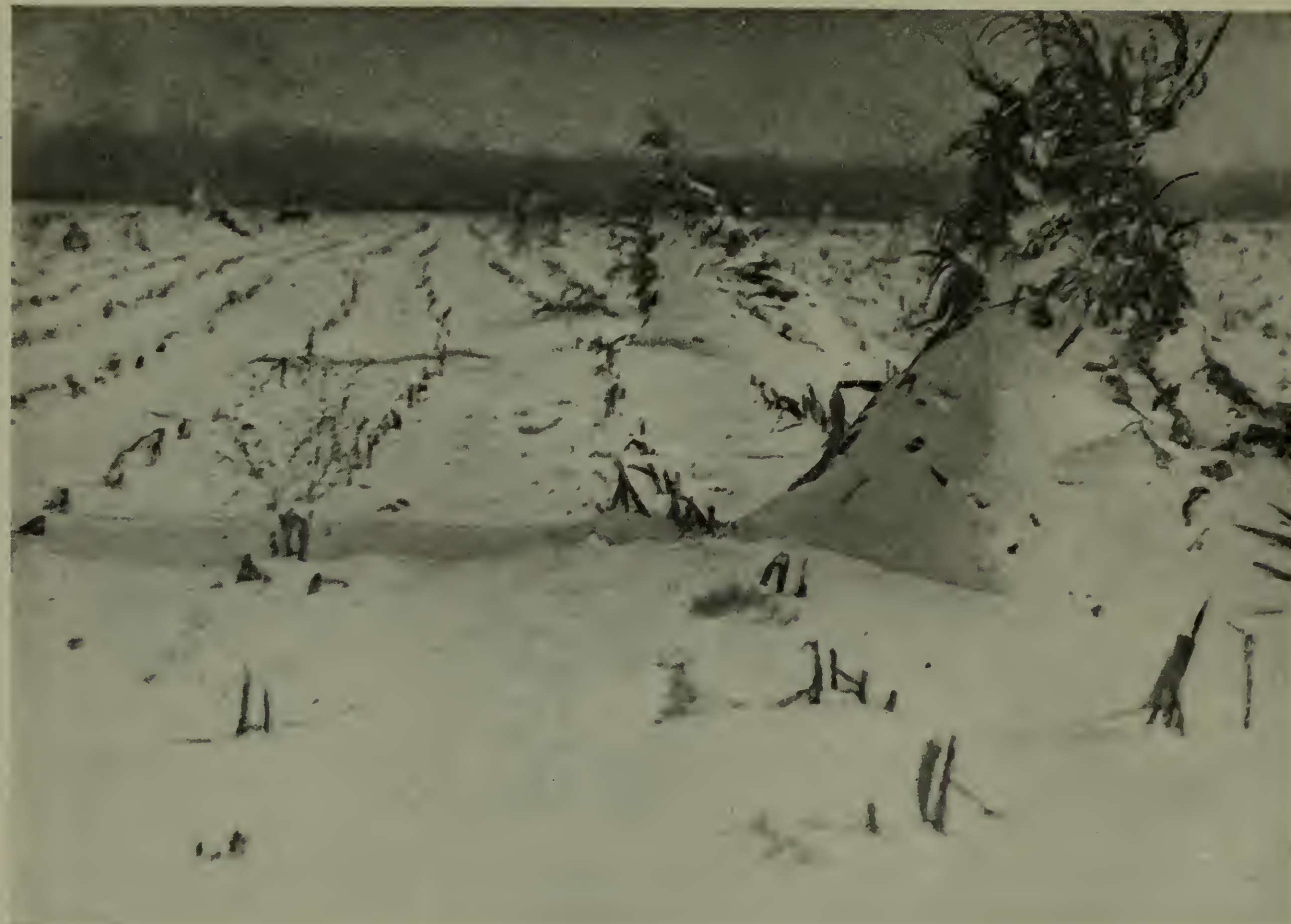
It is to this outfit I wish to turn your attention. While there has been great advancement in cameras, lenses, plates, and papers, you must admit that the photographer has been slow to take advantage of the wonderful advancement made in the way of outfits. The photographer, in other words, has not kept pace with the advancement in photography.

You see the home portrait photographer carrying an 8 x 10 camera and a burdensome equipment besides. Possibly he has substituted films for plates. Now, it is an established fact that enlargements from 4 x 5 negatives up to 8 x 10 can be made hardly distinguishable from contact prints. This fact alone should put the large camera out of the race in home portrait work.

One of the greatest boons to the home portrait photographer is the speedy anastigmat lens. A lens working at an aperture of not less than f 4.5 should be selected.

A small well made camera not over 4 x 5 and a good flash-light apparatus would make up an equipment hard to beat. The photographer's outfit should be of the finest quality—but not large and cumbersome.

While the so-called gaslight papers have lightened the burdens of the photographer to some extent, it must be admitted that they also brought him competitors. Competition works well to cheapen a product, thus to make a fat bank account one must by some way or other get out of the competitive race. In order to do so we must do something different from our



IN WINTER'S GRASP. CLEO. S. BOURGEOIS.

competitor. We all know how hard this something different is to do.

There are very few photographers who have originality enough to keep above plagiarism, so if we depend upon our skill to copy after the fellow with a big reputation, we will always remain in the competitive class.

Did it ever occur to you to try some of the new processes of color photography? I can tell you that they are the simplest things to work. The expense for small sizes is very slight especially when the results are so gratifying.

Autochrome, Dufay (or Dioptichrome) plates, not only make beautiful color transparencies, but prints of better quality can be made from them than can be made from plain plates.

The new Paget process should appeal to every energetic photographer who desires to be a leader in his art. While I do not expect the professional photographers as a whole to give attention to my hints, I do hope that some few artistic workers will look into the matter. It will pay you to devote some of your leisure hours practising with these wonderful color plates.

From autochrome plates you can learn a good lesson. As the glass side of these plates are placed face up in the plate holder so that the photograph is taken through the glass to the emulsion—halation is obviated. Try putting one of your plain plates in your holder, glass side facing object to be photographed. By doing so you can face your camera towards open windows or doors with impunity (Figure 1). Only in case a large camera is used will the ground glass have to be turned around to make up for the slight change of focus obtained by such a procedure.

While I personally am blessed with an excellent stock of lenses, cameras, etc., for home portraiture I use a small camera and a fast working lens, f 3.8, an agfa flash lamp, agfa flash powder, which by the way will not suffocate you even though three or four exposures are made in succession without smoke catcher. I might mention also that it is useless to make use of a diffuser. Laziness is my disease, but it is not so dangerous as hypochondria, or old foginess. On account of the acute form of this malady which has taken hold of me I have had to reduce my chemical operations to their lowest terms. There-

Figure 1.

Illustrating article "The Advance in Home Portraiture," by W. C. South.

fore, Rodinol does all my developing. When I say all my developing I mean just what I say—plates, color plates and papers. I have substituted color plates for plain ones, simply because a very slight extra exertion on my part leads me out of the competitive class. This is how I work it: I make a small color photo on one of the new color plates such as Autochrome, Dioptichrome or Paget.

From this small plate I make enlarged prints in black and white on sepia. I then dispose of the color plate (along with the prints) at a fair price. Don't you think this little stunt worth your while? Think it over.

Well to be candid with you I have all the work I can do printing, not only from my own color plates but also from color plates made by others. As I have one of the best equipped and largest photograph establishments in the United States I am thinking seriously of devoting my entire time to printing from color plates. I have just completed ān enlarging apparatus which reproduces color transparencies not only in monochrome but in all the colors represented in the transparency.

Should this new apparatus prove as satisfactory as a wage earner as it does as a color printer, I shall construct a number of them and put them to work. In the meanwhile get busy Mr. Photographer and learn to make color photos on glass. Small sizes are the best. Color photography is here to stay. It is a Godsend for a few live fellows. Take my advice and distance your competitors.

THE WAVE. JOHN E. BOULTENHOUSE.

THE REPRODUCTION OF NEGATIVES

By G. T. HARRIS

ONE of the many operations entering into the routine of a photographic publishing business, however small its extent, is the duplication of negatives, either larger or smaller than the original field negative. It causes very serious delay in field operations if several sizes are taken of each subject, to say nothing of the increase in bulk and weight of apparatus. Take one good negative of medium size and make other sizes at home, has been my motto for years past.

There is another advantage in making and working from reproduced negatives, although it may not be obvious: at home greater deliberation and the absence of any necessity for getting over a certain amount of ground in a given time permit of a leisurely inspection of the subject matter in a negative, and it is frequently found that the centre of interest in a negative is altogether overshadowed by unimportant surroundings, the result of hastily using a lens of wider angle than was desirable. In a reproduced negative the essential part is chosen and emphasized by filling up the repro. negative with it, to the exclusion of uninteresting and unimportant surroundings.

One great value of a good system of making reproduced negatives is the fact that should any damage occur to the original negative it is not necessary to travel perhaps two or three hundred miles, wait for fine weather and generally spend money before orders in hand can be executed. There is always the transparency as saviour of the situation. Finally a reproduced negative is often the only way to a passable result from a poor original.

The first step in the process of reproduction will be the procuration of a good transparency from the original negative. A carbon transparency, or a dry-plate transparency may be made, the latter being on a slow plate having a fine grain; or

an enlarged transparency on a slow dry-plate may be used, a method strongly advocated by some workers owing, it is claimed, to the greater ease with which it can be worked up, when the original is a small negative. My own preference is for the carbon transparency, though when a flat original requires reproducing it is better to use a slow dry plate and endeavour to obtain increased contrast by slightly under exposing it and using a hydrokinone, or concentrated pyrogallol developer.

My first care when a batch of new negatives has been developed is to secure from them the necessary set of carbon transparencies; the negatives, of course, having first been carefully improved in any required direction, i.e. local or general reduction or intensification, spotting, etc. The transparencies bear the number of the original negative, and are filed in the same manner as the negatives, so that no trouble whatever arises in at any time finding a transparency for reproducing a certain subject.

The carbon tissue I use is the "Special Transparency" tissue of the Autotype Company sensitised in a four-per-cent. potassium bichromate bath. The tissue is sensitised in lengths suited to the size of negative to be printed from, that is to say, strips for 6½ x 8½ negatives are cut in lengths 8½ inches wide, being trimmed to 6¼ x 8¼ when dry. The strips are immersed in the sensitising bath by rolling and unrolling in the same way as a roll film may be handled, taking care to keep the surface under the solution, and unrolling and re-rolling quickly at first to avoid the gelatine sticking when it first becomes wet. When thoroughly saturated with the bichromate bath there is no danger of its doing so. With a little practice several rolls may be manipulated in the bath at the same time. When the roll first immersed is thoroughly limp it may be removed and hung up. On removal of the tissue from the bath I pass the strip lightly between a rubber squeegee and a sheet of plate glass to remove the surplus bath solution and facilitate its drying.

The tissue should be dry in twelve hours at the outside, but eight hours is a good average. When dry it may be printed from forthwith, or stored until a convenient time in a calcium chamber. I greatly prefer printing from tissue that has been

THE INCENSE BEARER. LOUIS J. STEELE.

sensitised for one or two days. The sensitising bath should be carefully filtered every time it is used, as it must be remembered that all particles adhering to the tissue will be reproduced in the new negative. Scrupulous cleanliness in printing the carbon transparency cannot too forcibly be insisted upon.

With regard to printing the transparency. It may be laid down as an axiom that no under- or over-printed transparency can give a satisfactory reproduction. The printing must be exact within fairly narrow limits. I am aware that the temperature of the water used for development is said to compensate for errors in exposure, but I believe this statement to be on all fours with "tinkering" with the developer to compensate for errors in the exposure of the plate. At the same time some improvement may be effected in prints somewhat too dark by leaving them to soak for several hours in water of high temperature. If, however, prints are bare from under-exposure or dark from over-exposure it is better to re-print them. Development of the transparencies is best effected in wood tanks with grooves. My tanks are made to accommodate two dozen mounted glasses, i.e. twelve grooves, each groove taking a pair of plates placed back to back. The backing is stripped off and the tissue left to develop in water of a moderate temperature. As the plates are in an upright position during development no suspended matter settles on their surfaces to give spots and defects in the new negative. When development is complete the surface of each transparency is carefully washed under a rose tap. It may sometimes be desirable to "re-touch" the transparency during development by softly going over masses or parts too dark with a camel hair brush and water of considerable temperature, but it requires to be carefully done or blistering may result. An alum bath is recommended on the completion of development, and it certainly has the advantage of somewhat protecting the film from abrasion and the effects of careless handling; but I, personally, never find it necessary.

Retouching the transparencies when made is an essential operation if the best results are desired. Not only have spots to be removed by being carefully filled up with colour, but much may be done by toning down obtrusive high-lights with brush and colour, strengthening detail where weak in the transpar-

ency by stippling it up with colour used almost dry. Sometimes undesirable features may be entirely removed from the transparency to secure a better result in the reproduced negative; for instance, on one occasion I had an especially fine subject of quaint thatched cottages in a Dartmoor village, but at the back of the thatched cottages to my extreme disgust rose up a brand-new brick and slate house which could not be dodged without sacrificing the best view-point. When the transparency was made the offending house was removed entirely and the new negative is just a photograph of a group of old thatched cottages. This illustrates one of the great merits of reproduced negatives, disturbing features can be removed, and the photographer should always be on the *qui vive* for any opportunity of improving his transparency before placing it in the reproducing camera.

It does not seem to matter whether daylight or artificial light is used for reproduction work, the finished result shows no difference. Hence it becomes largely a matter of convenience. If a clear unobstructed outlook on a north aspect can be obtained no better arrangement can be had than a room converted into a dark chamber, with the enlarging camera and easel on an inclined base-board near the developing sink. The plate resting on the easel is in full view during exposure and portions may be screened with the greatest confidence to secure better results. Of course with daylight enlarging one is at the mercy of the light outside, and in winter or in the vicinity of large cities this is apt to let one down.

To obviate this I resort to artificial light for all reproduction work during the winter months. But whether daylight or artificial light be used the arrangement must be such as to ensure perfect smoothness and surety in working with no loss of time at any point. The camera as stated should be adjacent to the developing sink, the transparencies, all retouched, placed on a shelf near the camera, and a table close by provided for the supply of plates. The plates are exposed, taken from the easel, and placed in upright developing baths standing in or near the sink. The transparency is changed when the plate has been placed in the bath and the next plate exposed. By this arrangement work proceeds rapidly and smoothly, so that a large number of reproduced negatives can be made in the course of a day's work.

Coming now to the development of the plates. They may be developed either by tank or tray development. For the latter I use large trays accommodating about half a dozen $3\frac{1}{2} \times 5\frac{1}{2}$ negatives, but for an entire day's reproduction work tank development is preferable as involving less loss of time. Three dipping baths, each containing forty ounces of developer, and each taking two $4\frac{3}{4} \times 6\frac{1}{2}$ plates are made up with forty ounces of developer to the bath. By this means the work of exposing, developing and fixing progresses continuously through the day.

Tray development is more suitable for small batches, when the extent of work does not warrant a large quantity of developer being prepared. The developer may be practically any developer favoured. I know that glycin is always suggested for tank development and it certainly is excellent, but I have had equally good results with amidol, and, though all authority is against the statement, with pyrogallol also. It is noteworthy that when Wratten & Wainwright introduced tank development pyro ammonia was used altogether, and it would probably shock many latter-day photographers to know that before the era of "non-staining" developing agents pyro ammonia tank development was used almost exclusively in several large commercial establishments, and further, that time development was applied also!

Tank development with pyrogallol is accused of causing marks of one kind and another and I feel that under the circumstances it will be wiser to leave the choice of developer for this form of development to the individual, merely stating that an average time of ten minutes' development should be sought for as one most convenient. It will, of course, be obvious that during a day's work the developing solution gradually becomes weakened so that additions from time to time of a portion of concentrated developer to the bulk becomes necessary. Generally speaking when about eighteen plates have been developed in one of the baths an amount of concentrated developer representing half the original *solid* amounts should be added.

An acid fixing bath is to be preferred for extensive reproduction work, and here again I am in conflict with recognised authority. Personally I cannot afford to have negatives that

PAPA'S COMING. SIDNEY V. WEBB.

entail a large expenditure of time and money, fade and become useless in the course of a few years' use, and as I have used an acid fixing bath exclusively for the last twenty-five years the inference is obvious. My fixing baths are as colourless when thrown into the residue tank as when first made up, or to be quite accurate, there is a very slight yellowness when looked through in bulk. Potassium meta-bisulphite is recognised as being the safest and most convenient agent for acidifying the fixing bath, but I find sodium sulphite acidified with acetic acid equally good and reliable.

A good many of my reproductions are made for printing views for Christmas cards and calendars, so that the negatives are quite small, that is to say, from 2 x 3 to 4 x 5. When such negatives are wanted it is convenient to expose several subjects on one plate, say four 2 x 3 negatives on a half-plate (4¾ x 6½) and cut to size when finished, or use the combined negatives to print in sheets. Usually they are cut up as it seldom happens that equal numbers are wanted from the four negatives that happen to have been made together. It is, of course, easy to make the combined negative by having a mask the size of the plate used and cutting from it a section the size of the required negative, using the horizontal and vertical adjustments of the copying camera to secure the various positions.

The plates used in reproduction work should be slow, i.e. about 50 H & D to 100 H & D. If rapid plates are used flat negatives lacking opacity are likely to be the rule, and from such negatives good prints can never be obtained. With a good plate of medium speed there is no necessity for backing, neither is there any need for its being an orthochromatic plate. It may be interesting to state that some commercial houses doing a large amount of reproduction work even at the present day use altogether wet collodion plates, and one house known to me using collodion produces remarkably fine results.

In conclusion let me affirm that, given a good original negative and care in making the carbon transparency, there is no reason whatever why reproduced negatives should not equal the originals in quality and capacity for yielding good prints.

THE INCOMING TIDE. GEORGE ELLISON.

USING THE EYES

By CHARLES E. FAIRMAN

MUCH has been written about various photographic operations, of the choice of cameras, lenses, plates, color-screens, shutters, and expensive apparatus, also of printing methods, of papers—printing out, self-toning, developing papers, and brush developed papers. We have been edified by learned articles upon tank development, factorial development, rational development, etc., while of formulæ for all classes of photographic manipulations, enough have been published to fill several volumes of *The Annual*. We read of technique, of expression, of individualism, and of the claims of competing schools or photographic factions, and while all of these matters are valuable and worthy of consideration as contributions to the sum of things known photographically, yet without a proper use of the eyes, or of that faculty or ability known as selection, we are starting in the wrong direction to build up a wise photographic versatility, without giving greater emphasis to the training of the eyes to see pictures before exposing the plate or film.

My attention was called to the necessity of the seeing of the picture, by a remark made by one upon viewing a photograph of a very familiar landscape seen by him many times. He recognized the locality without other suggestion than that afforded by the photograph, and after a careful scrutiny, remarked, "this picture is far more beautiful than this actual spot is in nature."

Of course all will differ with this estimate. Its greatest value, however, is not as an estimate, but as an indication, that through the photograph the eyes had been opened and the beauty of a small selection from a very beautiful landscape, had made its appeal to the person who formerly had passed the place time after time without noticing its charm and attractiveness.

PORTRAIT OF ALBERT HERTER. Albin Studio.

I am perfectly aware that this is a long introduction, but if it shall meet the eyes of those who have wondered why some photographs are pictures and others nothing but a result of a properly exposed, and judiciously developed plate, supplemented by great care in the printing of this perfect plate, and if as a result, more people who are sincerely desirous of adding pictures rather than photographs to their collection, then the space has not been used in vain.

I think that it is safe to assert that every picture by the means of photography, becomes a picture, mainly because the user of the camera had selected something worth the while to make a photograph of rather than for the reason that his exposure, development, and printing methods are technically perfect or nearly so. Selection counts for more than technical skill, and yet selection is a matter of as much skill as any other portion of photographic achievement.

Photographic expression is but causing others to see and feel what you have felt when you have selected your subject, and decided the metes and bounds which enclose the best of the subject before you. If your work does not convey to others the feeling of an attempt, in which a mind has controlled the apparatus used, and made all of the factors subject to the dominant idea of a message of the thought of the camerist, then you have not reached that for which you have toiled.

It may be asked "how shall I select my pictures" and I must in reply to this inquiry admit that the question is easier to ask than to answer. I know of no formula, recipe or precept, and if I did know of such a formula, I should hesitate to advise its use. All nature is a book in which some of the chapters are pure landscape, other chapters marines, other chapters may be called just people, and you must do as others have done, go to this great book, and study, study earnestly and long, and then keep on studying, form you own estimate, and compare with the estimate of others and try and express in your work what you have seen.

If you are a diligent student you will probably learn that there are times when the most commonplace landscape is filled with compelling charm, and you will also find that some of the plainest of the plain people are very attractive if you only find the time and the place when the best in them can be seen, when

you have found this time of all times, either in the landscape, or in the portrait, you have made your selection, and your work should commend your choice.

Above all things I would urge the maintenance of high ideals in photographic work. The photograph taken "just for a joke" usually looks the part, while on the other hand, those who see in their work the possibility of conveying to others a message of beauty, while they may not meet with the success desired, will be benefited by the effort in the right direction, and comforted by the reflection that they have attempted work in which the purpose is commendable.

The best of photography, like the best in art, is that which for the longest time has given the largest satisfaction to the greatest number of people, and to attain the best the eye must be trained, and we must learn to select that which contains the picture, and shun that which is thoughtless and careless in selection.

PLAYMATES. H. P. DAHLEN.

PORTRAIT. WILLIAM SHEWELL ELLIS.

CAPSULE AND TUBE DEVELOPERS

By NAJA

THE average amateur is a little shy on the use of Pyro. as a developer. The main reason being due to the fact that Pyro. stock solutions do not keep well.

Circumstances some time ago forced me to solve this difficulty for myself. (This prior to the advent of tabloid goods.) The capsule idea is what did it. I procured from a druggist some No. 12 veterinary capsules with a rated capacity of two drachms. One capsule holds both sodas: sulphite one drachm and carbonate one drachm. Another capsule filled holds, when not packed too tight Pyro., drachms one-half, Pyro. being very light. The contents of these two capsules dissolved in water makes six to eight ounces of developer, depending on the strength desired, weather conditions governing somewhat. Weaker developers in summer, and stronger in cold weather. Pyro. developers may be benefited some by adding a few drops of oxalic acid stock solution, five grains of oxalic acid to four ounces of water makes this. In putting more than one chemical into the same tube or capsule, it is well to separate them with a little disk of paper or a little cotton.

Other developer formulae may be figured out for loading into tubes or capsules, and one can spend an otherwise idle day in loading up a supply. Here is one which is excellent for bromide papers. One tube contains sodium carbonate 1 2/3 drachms, sodium sulphite ¾ of a drachm, Hydroquinone 10 grains, Metol 5 grains. One tube makes from six to eight ounces of developer. A few drops of a 10 per cent. stock solution of potassium bromide should be added to this developer.

What is known to the drug trade as a standard No. 1 capsule is rated at about five grains. One No. 1 capsule filled gives you a measure of Metol: filled twice, gives you a measure of Hydroquinone: A common lady's sewing thimble filled

SUNLIT WOODS. George Ellison.

once and a third comes close to giving you one drachm of your sodas.

I can almost see some of my readers asking are these measures accurate? No; they are not. The writer's experience, however, has led to the belief that ultra-exactness in the way of measuring developer ingredients is not altogether necessary. The proper chemical re-actions take place any way, if the general ratio of parts is maintained, and the formulae here given are close enough for all practical purposes.

The ingredients of any of these developers could all be put up separately if desired, each in a capsule by itself, in this way all chemicals could be kept separate.

THE WORLD BEYOND. *Copyright by Edith L. Willis.*

DEVELOPMENT

By MARCUS G. LOVELACE
Lovelace Research Laboratory

IT has long been the opinion of the writer that the time was ripe for a revival of intelligence amcng the photographic brotherhood, amateur and professional. It has been a pleasure to him for some years past to study the theoretical side of photography for the mere joy of finding out "How it works", in the language of the small boy. The mere making of a negative by chance is so easy that the beginner, and too often the professional, is ready to make up for lack of theory and science by the laws of chance. The idea that exposure and development are things that are more or less intuition or inspiration, or even of long experience, has been with us a long while and seems to have a hard death.

The contention between art and science, if such there be, has waged nowhere more bitterly than among photographers. It is not uncommon to meet a mental replica of the famous vocal animal of the Scriptures with the attendant noise of its kind, loudly proclaiming the ability to force, soften, or restrain development. This school is founded on the principle that an exposure of unknown length, followed by development, "until it's enough" with a guess at the time of printing, followed by the happy idea of taking a D.O.P. print out of the developer when it's black enough, will give a print with "atmosphere" and "feeling."

Doubtless makers of plates, films and papers, will welcome such workers, but their troubles are of their own making, and it is the hope of the writer that he may be a voice crying in the wilderness to call such benighted ones back to the safe and sane path. Perhaps it is wrong to include the makers of films among the ones who encourage the amateur to waste his money, for they have done more to forward the correct and scientific mode of development than almost any one else, and the instruction books of the film makers are full of cautions

I WON'T TELL. D. L. SMITH.

with regard to the methods used in the tanks, and with their papers, and the successful amateur is usually the man who follows these instructions to the letter.

When he has reached the point where he can make ten good negatives—that is technically good, not artistically so—then he will be ready to play about with developers, and by the time he has reached that point he will understand that the methods he has been using are founded, on a mass of scientific research, that are quite sufficient to give the ordinary man a headache if he chances to read them without due preparation.

On looking over the ANNUALS for the last eight or ten years, a statement of the actual facts of development has not been found and it has been thought well to state them for the benefit of those who need the facts in a concise form, free from any scientific terminology.

To begin then at the beginning, we find in a work printed in the moyen age—that is about 1890—the following statement. "Not too many instructions can be given for the beginner in development, for it is the most difficult part of photography, and it is only by means of the most scrupulous care and attention to this point that perfect results can be produced". In this work—which is Duchochois' "The Photographic Image" —we find the gospel of tentative development, of which the motto was "I hope I get something" and which is yet to be found without any trouble in the dark rooms of too many workers. By this method is meant that idea of taking an over-exposed plate and developing it with a strong developer with a great deal of bromide with the idea of getting a sufficient amount of contrast, and of taking an under-exposed one, and developing it with weak developer, or according to one writer, with a "developer that will raise the dead". The man who puts a plate or a film in a tray and develops it until it is black enough, is following this method today.

The turn in the tide was not without some warning, for Houdaille had done some work along the lines of a scientific system of development, but the first system was probably due to the researches of Hurter and Driffield. These two workers began the work by their investigations on determining plate speeds. Previously what determinations had been made were done with instruments, similar to the carbon printing

THE RIVALS. GERTRUDE KASEBIER.

actinometer which consists of a series of graduated densities. Exposure was made to a standard light with the plate to be tested behind such a screen and after development, the last square which showed a difference from the less one next it, was made the rather arbitrary standard for speeds of that emulsion.

The weak point of this was, the fact that it did not show what a plate did when under or over-exposed. Hurter and Driffield imprinted a series of exposures, each double the one preceding it and after developing with a standard developer, read these densities on a photometer. Here at last was a system that told us something about the behaviour of a plate and its actual speed.

It was found that there was a certain portion of time during which a plate could be exposed without giving a useful density, that there was a range of time, which varied in different plates, in which any exposure within that range would give a useful density and that as exposure increased, a place was reached where instead of becoming more dense with greater exposure, it actually became less dense. These portions of the plate curve show that there is a point of real under-exposure, then a long range of exposure, or latitude if you choose to call it so, and then the period of over-exposure.

A method of marking speeds was devised from this by dividing 34 by the inertia, (the amount of exposure which did not produce a usable density). The actual working out of these figures, and facts, require more of a knowledge of mathematics than falls to the lot of the average photographer, but it can safely be said that the main facts of Hurter and Driffields System, or H. & D as it is called are absolutely correct. All systems of plate marking are founded on it although many of these markings are incorrect from improper application of the principles involved. Hurter and Driffield (to sum up) proved that there is a definite amount of exposure required to produce any appreciable effect on a sensitive emulsion; there is a definite range of time during which a plate can be exposed to the action of light, with merely an increase in density—and on increased exposure, the density does not increase, but vice versa.

The range of exposure varies with different emulsions, and

KATHRYN AND EUGENE. A. B. HARGETT.

with some the range is very long. In a recent experiment, the writer using a Wratten and Wainwright Panchromatic Plate gave exposures, of 5, 10-20-40-seconds, 1-2- and 4 minutes. These were all tanked together, and incredible as it may seem to those who do not use the plate named, any one of the negatives would have given a satisfactory print. Some would have printed on Contrast Cyko in a second or so, and some would have printed on Bromide paper in the course of a half hour's sunshine, but the gradation, and the detail was there in all. Naturally the longer exposures showed more detail in dark objects, than the thin ones, but the fact remains that with such a plate, the range of exposure is very long. Some of the cheaper plates will not stand more than one-third of the correct exposure without being soot and whitewash, nor will they stand more than two or three times over-exposure without flattening out.

The exposure meter followed rapidly on the heels of the H. & D. System, and we then had the working speed of the plate, and a means of determining the correct exposure for any occasion. Mr. Watkins following out the researches of H. & D. made a series of experiments on developers, and in his first published results established the following facts. Six developers were used—Pyro—Metol—Ortol—Kachin—Hydrochinone—and Glycin—test exposures were made, and carefully read. The results are given below.

1—There was no difference in the speed of the plate with different developer, that is, one developer is as good as another with regard to over or under-exposure.

2—There was no difference in the amount of detail produced.

3—There was no difference in the ultimate density produced.

4—There was no difference in the fogging propensities.

5—There was no difference in the gradation.

6—There was a great difference in the amount of time required to do the same amount of work—that is in the speed of development.

7—There was great difference in the time elapsing between immersing the plate and the first appearance of an image.

From this as one writer says, If all photographers were required by law to use one developer, no one would be the

A DEVONSHIRE COTTAGE. G. T. Harris.

worse off. As a matter of fact it is possible to develop any kind of a negative with any kind of developer.

Developers may be divided into two classes, however. In the first class, the factor, or relation between the appearance time and the completion of development is quite small, so that if the first trace of an image appeared with hydrochinone used without bromide, in forty seconds from the time of immersion, in 4.5 times forty seconds or one hundred and eighty seconds, development would be complete, and we would have a negative with the same relative contrast as the object photographed which is the standard negative of the Watkins system. The ordinary worker would think that from the fact of the lights having appeared much before the shadow detail that development should be longer, and by so doing would produce the ordinary soot and whitewash negative which this developer is thought to produce. It will give exactly the same sort of negative as metol if developed properly.

In the second class of developers, we have metol, dianol, amidol, rodinal, and many other developers. With these the whole image appears at once—shadows and high lights—or at least it appears that way to the average eye. If these are developed for the correct time, we can secure as much contrast as we wish. It is too long a statement of facts to be acceptable to the average reader, but the research of Watkins, Mees, Abney, Renwick and others have proven beyond a doubt the facts of development, and practically borne out Mr. Watkins conclusions with regard to contrast.

This conclusion was that contrast in a negative depended on the length of time it was developed, other things being equal. If three exposures are made, exactly the same on the same object, and one is developed two minutes, one three minutes, and one four, the difference will be perfectly apparent. If one is using a factor if the factor is decreased, we get softness, if it is increased we get contrast, the exposure remaining the same. The results of these two investigations—Hurter and Driffield, and Alfred Watkins, was therefore to establish these facts—

1. Within the limits of the plate—exposure controls density.
2. Contrast in a given exposure depends on the length of time it is developed.

development at any temperature with the developer used. It is, of course, perfectly obvious that over-development to the extent of ten per cent in a tank has exactly the same effect on a plate that a corresponding amount would have in a tray. The matter of temperature, therefore, is of basic importance.

It was also found that emulsions could be divided with sufficient accuracy into a few classes which were called development speeds, as it was found that with a given exposure and the same development, plates differed as to the time taken to reach a standard density. This is compensated for in the thermal development system by a dilution of the developer to fit the plate. This method has been worked out for a particular developer by the Eastman Company for use with their films in a tank, and has been worked out for practically all plates and all developers by Alfred Watkins in his work, "The Principles and Practise of Photography" which I can recommend to the attention of every man who owns a camera.

The facts and principles on which the method rests are, as I have said, of a complexity that while interesting to the advanced photographer, can hardly be within the grasp of the amateur or the busy portraitest, although from a mere financial standpoint it would be dollars and cents to either class to study them. I have purposely made this article as free from figures and scientific terms as possible in order that the subject may by reading this, become of interest to the readers of the ANNUAL.

The work of the research laboratory, is a thankless task, as the average worker takes very little interest in the theories of his work as long as his results are within reason. These labors, however, have this much to say to the amateur with regard to developers. "Any developer is good for plates—the developers for papers are all good for papers, and many of them can be used for plates, papers and bromides equally well." The world is full of advertising that is more often clever than truthful with regard to some new compound of miraculous properties, but in the language of Josh Billings, "It is better not to know so much than to know so many things that are'nt so".

Gratuitous advertising is not to be thought of so I am not going to boost any one's goods, but if you have a Kodak—get

CHILD PORTRAIT. Ira D. Schwarz.

a tank. If you use plates—get a tank. Any tank is good as long as it's reversible and is easy to load in the dark. Then get used to loading plate holders and tanks in the dark. Excepting the Wratten Safe Lights and the Isochrom made by Burke and James, there are no ruby lanterns on the market which are safe for any plate faster than a lantern slide as a test will show, and it is surprising the amount of actinic light the average ruby and orange combination will pass. It is quite common to find a man who has built a dark room that is absolutely light tight and is working at a distance of eighteen inches from a ruby lamp that will fog bromide paper.

In connection with bromide paper it used to be said that an enlargement always was more contrasty than the contact print from the same negative, but unfortunately this is not so, and if you are enlarging the following is a safe test. Use the same paper for enlarging that will give you a satisfactory contact print from the same negative. Velox and Azo make splendid enlargements, although rather slow. But if you get the sort of a print you want on special Velox, then you will find that it will make you a splendid enlargement with practically the same contrast. There is always a loss of contrast in an enlargement due to the fact that small shadows are spread out until the eye takes in the high lights between them, which it cannot do in the small print and the result is that the shadows in the large print look grey compared with the small one. There are so many things that could be said with regard to enlarging that it is hard to choose the most needed result, but one obtrudes itself at present and that is—unless you have an arc lamp—a Cooper-Hewitt Tube or have the time to use daylight, buy a pair of condensers. They do not cost much, and the comfort of having enough light is well worth the added expense of purchase.

The action of the various components of a developer is a matter that seems to be rather uncertain in the minds of most workers, but here again the research laboratory steps in with the data obtained by scientific methods, to dispel the haze. To begin with the developing agent itself—pyro, metol, etc. The amount used has only a bearing on the speed of working, as with a doubling of strength the time required is only half the ordinary solution. The development factor is changed

with pyro and amidol or dianol if the strength of the developer is changed, these developers being high factor if used in weak solution and low factor if used in strong.

With other developers, the factor remains the same, if no bromide is used. There is no advantage in a developer that contains a great deal of the developing agent, other than a slight saving of time in the actual development. On the other hand, there is no advantage in using a weak developer unless it is desirable to have more time to handle the negative in the making. As a matter of fact, some workers in England have been using with great success a developer that will entirely develop a plate in one minute, and there is no reason why anyone should not obtain the same results using a very strong developer that are obtained with a weak one. The factor will take care of the contrast, and it is merely a matter of convenience in working which is used. Pyro has the reputation of giving yellow negatives, and so it will if insufficient sulphite is used. With sufficient sulphite the image is as much a blue black as a metol image. The old idea of using a clearing bath of various composition is a relic of the dark ages, for the yellow stain (so-called) of pyro is only the colour of the reduced silver, and is absolutely unaffected by any known bath that will not destroy the image itself. A yellow negative, however, will not intensify or reduce as readily as one of a colder colour due to the yellow colour being an integral part of the image, and not as easily affected by the later treatments.

With regard to the alkali or accelerator, as it used to be called: ammonia was used at first, but it was very unreliable, as its strength is constantly varying, and its property of becoming weaker from the beginning of development, regardless of the action taking place in the developer has driven it out. Sodium Carbonate is probably the most satisfactory one in general use, although it has no particular advantage over potassium in actual work. The activity of a developer varies with the amount of carbonate, that is, a strongly alkaline developer works faster than a weak one, but the result, if the factor for the developing agent is used in both cases is exactly the same with a small amount of carbonate or a greater. From three to six times the weight of the developing agent is about the useful limit, and nothing is gained by departing from these

MOTHER AND CHILD. IRA D. SCHWARZ.

limits. Potassium carbonate is sometimes used but presents no advantages over the sodium salt.

With regard to formaline it is really only useful with hydroquinone, although it can be used with most developers. Acetone, is a very good substitute for sodium carbonate and has the advantage that it does not soften the film in hot weather. It can be substituted for sodium carbonate by using 2.5 cc of C.P. acetone for each gram of sodium carbonate used. Other than the advantage named above there is nothing to recommend it. Formosulphite made by the Lumiere Company, is a mixture of para-formaldehyde, sodium sulphite and a bromide of some sort. It is very satisfactory in use, requiring no other addition than the developing agent and works well with nearly all developers. Trimethylamine is also used sometimes, a 10% solution being employed, but its detestable odor is quite enough to deter the average man from using it a second time, the more so as it has no advantage over the carbonates.

The caustic alkalis, the hydrates, of sodium potassium, and lithium, are very useful developer constituents, as it is not necessary to use an excess, as a compound is formed by their action on the developing agent which needs to be but slightly alkaline in order to develop. Rodinal is an instance of the use of these agents and a very satisfactory substitute for it can be formed, from paramidophenol, sodium sulphite, and lithium hydrate, which is probably the formula used by the makers. At any rate it gives the same results.

Sodium sulphite is useful only to prevent stain with pyro and can be omitted if the orange yellow negatives produced are not objectionable. Increasing the amount of sulphite causes a pyro developer to produce colder tones, more of a blue black than a brown black. It also tends to prevent the developer from discolouring while in use. Otherwise it has no effect, and with many of the newer developers may be omitted entirely if necessary. Sulphite for all practical purposes should be present in the developer to the extent of ten grains per ounce of working solution to exercise its desired effect to the useful limit. Bromide is a legacy of the wet plate days and if exposure has been within reason, it is absolutely unnecessary. Modern plates do not fog as the older makes did, and unless there is known to be gross over-exposure it is best left out. Of course with papers, and lantern slides, it is necessary to produce the contrast desired.

The use of bromide with an ordinary developer, produces the effect of slowing the plate, and with a low factor developer where shadow detail follows slowly, such as hydroquinone, it will prevent the appearance of detail in shadow, until the high lights have obtained some density. If, however, with the higher factor developers it be used, the only practical effect is a slowing of development, and if the process be carried to produce a standard density, the result will be practically the same as if no bromide had been used. With the very high factor substances, such as metol or amidol, bromide has very little use, as by the time the high lights have appeared, the shadow detail has also appeared and the actual result is simply a slowing of development, meaning more time taken to produce the same result as the same developer used without bromide.

On the whole if one uses a meter, and a tank, bromide is

a thing that is useful only with papers, and lantern slides, where short factor developers are used. With low factor developers the addition of bromide alters the factor making it shorter. It also has the effect of making a plate work slower, from the holding back power it has in the lower tones, although there are plates where the addition of bromide seems to make them work faster, but this is probably due to some abnormality in the emulsion and is of such rare occurrence that it may be disregarded.

It has been stated several times in the last year or so that the laws of development and of light itself can be altered by the use of a developer containing only a trace of alkali, for development of night pictures and subjects showing much halation under ordinary circumstances. The writer of this has been at much pains to test this, both from a practical standpoint and from a theoretical, with a negative result. With regard to night pictures, if there has been no detail impressed on the plate by the action of light, there is no way in the world of developing any, and under those circumstances, any developer will do anything that any other will. With regard to the no alkali method of developing pictures against light that would ordinarily show much halation, the same negative result holds good. The system is very old, and has died a natural death several times. Its last public appearance was in 1898 when one M. Colson, a Frenchman, brought it forward under the name of confined development. The idea of it was that by using a very weakly alkaline solution, and not rocking the tray, that as the greatest amount of bromide was liberated at the points of greatest exposure (the high lights) therefore at that point there would be formed an excessive amount of bromide, and that these portions would be held back while the rest of the plate developed itself. In practice it never did anything to deserve the advertising it received. Its modern revival is one of those recrudescences which (like perpetual motion) will not die quietly, and remain dead.

With regard to halation, more of this is due to under exposure and forced development (prolonged development) in the hope of getting what is not there than any other cause, and it is perhaps safe to say that halation is 80% under-exposure, and 20% reflection from the back of a negative, and creeping

of light action. Much good work, of a difficult nature, such as interiors is done by correct exposure for the shadows, and the use of a strong developer, which tends to produce contrast, and which develops the surface of the film, producing a thin negative, and by stopping development before the portions of the film where the action of the reflected light is strongest (that is the portion next the glass) have had time to develop at all. Such a negative will probably need intensification, but it does produce good results, and to the writer's knowledge is used with great success by several commercial firms.

And last, as well as first. The tank is not a theory, nor is factorial development. They are the products of brains that work in things too difficult for most of us to understand, and they follow the laws of science; laws worked out at great expense of time, labour and thought as well as money. Let us honour the men who have taken the art science of photography out of the chaos of the rule-of-thumb practises—Mees, Shepherd, Watkins, Abney, Chapman-Jones and those others less known, but still to be honoured, who have worked and planted that we might reap, and who, in spite of the writers of curious articles on how-not-to-do-it in amateur magazines, know more, very much more, about exposure and development, than you or I can reasonably hope to know with our limited opportunities for research; and let us not flaunt our weakness in the face of the scientific world by refusing to learn when we may if we choose.

THE MAID OF THE MIST. W. H. PORTERFIELD.

VACATION OUTFITS

By C. H. CLAUDY

EXPERIENCED photographers know without being told what is essential and what is unnecessary when going a picturing on their vacations. The beginner, however, frequently flounders between the Scylla of too much and the Charybdis of too little, and ends either by so loading himself with apparatus that all pleasure departs from his outing, or takes so little that none but the simplest of photographic problems can be solved.

Correctly to decide what to take on a vacation, it is first necessary to determine whether the vacation shall be one in which the photography is purely incidental, or whether it shall be one in which the pleasures of photography shall play a large and important part. Translated into photographese, this means "Shall I develop, or develop and print on my vacation, or shall I simply expose and leave results for care at home when vacation days are over?"

There is much to be said on both sides. Vacations frequently bring photographic opportunities which are not easily to be duplicated. Not to make the most of them is to lay up stores of regret for fall and winter. Not to develop, at least, at the time and on the spot, is the most prolific cause of failure to make the most of opportunities, since without development, only the dyed-in-the-wool expert can be sure that his exposure has given him what he wanted—and he cant always be sure!

Developing at the time the exposures are made, shows at once whether or not the desired result has been had. If not, it is usually possible to make another and better exposure, guided by the experience of the first mistake. But if one waits for the home coming, the mistake cannot be rectified and the disappointment must be swallowed, then and there. Making prints, too, while away from home, has possibilities for pleasure, since souvenirs can be given away at the time and on the spot, to friends one always means to remember "when I go home"—and so seldom does!

THE EARL OF CARNARVON. LOUIS J. STEELE.

On the other hand, carrying a developing and printing outfit along means some degree of trouble. Many hesitate to burden themselves with photographic impedimenta simply for fear that the weight and bulk will prevent them from enjoying other parts of their outing.

Nevertheless, after an experience of a good many years, which has included vacation developing and printing not only at summer resorts but in the wilds, on camping trips in which everything had to be transported in a canoe, I believe that the beginner will find such a vacation outfit worth all its costs in time and trouble. In the old days, when plates were the only

Figure 2.

practical material, and cameras less than 5 x 7 inches were beyond the pale, such an idea would have received scant encouragement from any one. But with kodaks which fold up, developing tanks which go in suit cases, chemicals which come in packages and paper which is fool proof, a complete developing and printing outfit can be packed in a suit case, weighing, camera and all, less than nine pounds.

Forgiveness is freely extended to the incredulous. But if you will look at the picture of such an outfit on the scales (Figure 1) you may the more readily credit what I say. Here is (1) a kodak (2) a developing tank with box, apron and

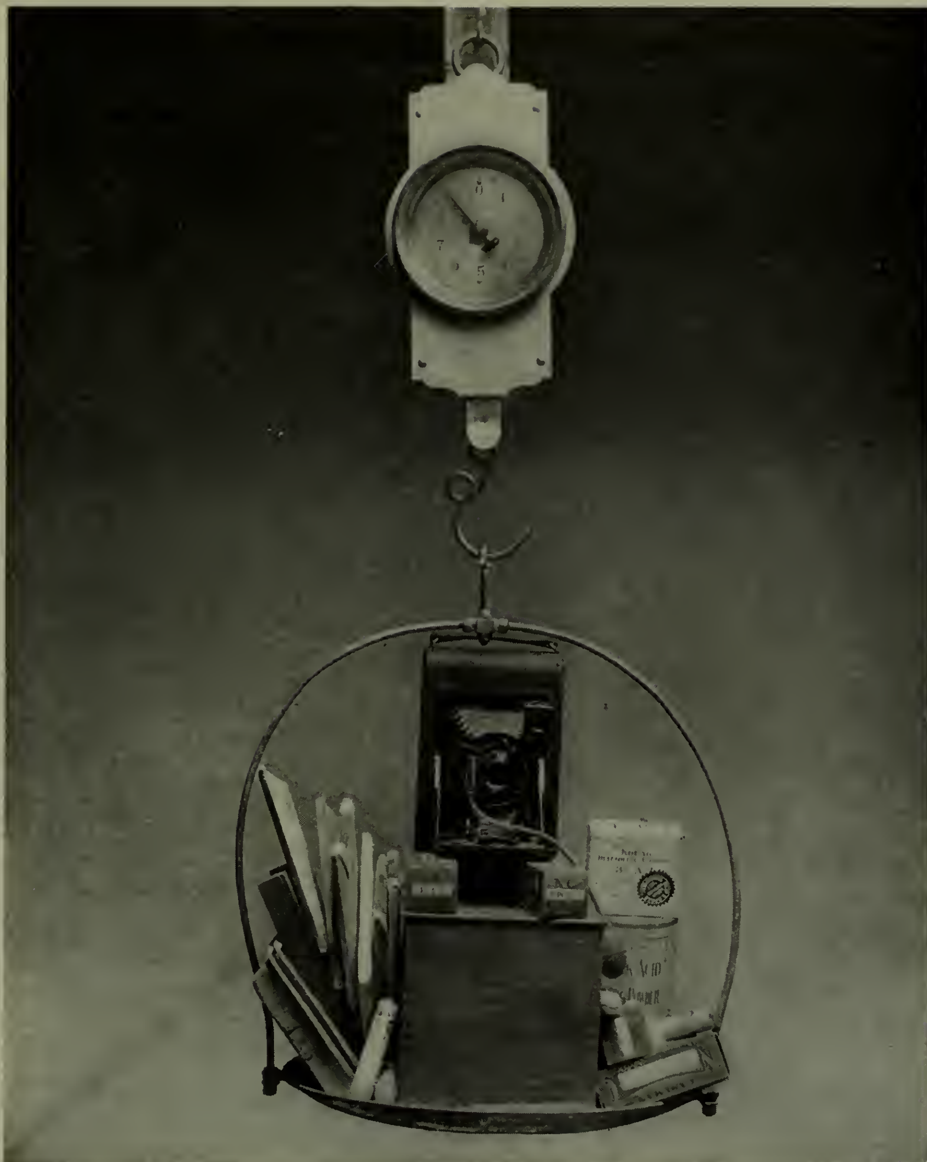


Figure 1.
Illustrating article, "Vacation Outfits," by C. H. Claudy.

metal cylinder (3) six rolls of film (4) six packages of paper (5) one printing frame (6) two trays (7) a pound of fixing salts (8) a package of developing powders (9) six tubes of paper developer. Though small, this is a complete outfit (Figure 2). With it one can make seventy-two finished pictures. It weighs, as stated, less than nine pounds. It goes easily into less than one-half of the ordinary dress suit case.

It requires only water to become operable. It needs no dark room, nor special quarters. It can be used anywhere from a hotel bed room to a camp in the woods. A bucket for water can always be borrowed, and a wash basin does for hypo.

Of course, the hypercritical will say that the capacity of such an outfit is limited from the lens end, that one has neither large size of picture, long focus lens nor capacity for making speed pictures. All very true. But how many people want to carry a large, long-focus, stand camera, a focal plane shutter and a large telephoto lens, on a vacation? Certainly not the beginner, unless, indeed, his attack of photographitis is so severe that his brain is affected and his sense of value and balance utterly destroyed!

The curious will note the omission of a tripod, even the lightest of folding tripods, from this outfit and may cavil at the absence of either ray screen or portrait lens attachment. The latter two articles are neither of sufficient bulk or weight to be omitted on account of clumsiness. They are left out here simply that the issue may not be confused, and to show a practical photographic outfit for vacation use at its very simplest, smallest and lightest, without reducing the size of camera and consequent results below the standard quarter plate size which has for so long been so popular. The tripod, however, is not at all an essential. Probably 95% of all vacation work can be better done with a snap shot than in any other way. The remaining five percent is better and more easily cared for with a soap box, chair, table or tree stump, than by carrying a tripod. Granted the latter is the more convenient, it is nevertheless true that it is foolish to carry it ninety-five times when it isnt used for the sake of the five times that it is!

The outfit, of course, can be still further simplified by omitting the paper, printing frame, and paper development chemicals as well as the two trays. But these are the lightest part of the nine pounds and take up the least room. As long as one must carry hypo, films, a tank and camera, it seems absurd not to go the whole way and add the few additional pieces of apparatus and chemicals and supplies necessary to make at least permanent proofs in the field. And whether you carry nine pounds or seven and a half makes little difference to either your own or the porter's arm, in the long run!

CHILD PORTRAIT. NICK BRUEHL.

THE HIDDEN CAMERA

By N. B. AUKERMAN

THE hidden camera or the psychology of portrait making is a branch of the profession which is suffering greatly from neglect. The period in our development has arrived which makes it imperative that we combine science with the profession if we are to continue to advance and keep abreast of other achievements and other business.

Some workers have made use of psychology in their work unknowingly, others have used it with full realization of its value. Its use, however, is not general, by no means so general as it should be; its value has either not been recognized or it has been neglected.

The result is, that by far too great a majority of the portraits we see of our friends, and those which we see in our friends' homes, are more nearly physical maps of faces and figures. They show either lack of thought or thoughts which one does not recognize, thoughts which are foreign to their lives as one knows them; they show all too plainly that your friends at the time the photograph was made were thinking of something which they probably had never thought of before and likely would not again, until next time they would have photographs made.

All this is due to conditions and circumstances which we may respectively make and control.

The ideal conditions for portrait making might properly consist of complete elimination of both camera and operator together with accessories and other equipment. The operator certainly should be eliminated only as an operator and not as an unnecessary part of the outfit.

He or she should be a person with capabilities and qualifications of the highest order essential to a host or hostess, and should maintain a position as such at all times toward the client. In this way the personality as an operator may be obscured, and the way opened for the elimination of many

CLASS NIGHT. N. B. AUKERMAN.

other obstacles and obstructions which are constantly retarding the advancement and frequently discouraging to the point of failure many an otherwise promising student.

The elimination of accessories, etc., literally being out of the question the aim is to obscure to the greatest possible extent the camera; the box with one great eye in its head; the machine that robs us of the thought; the feeling and character, deprives us of the one thing we most want to get—the picture which life's experiences have stamped on the face and molded into the soul of the subject. The finer sensibilities recoil as though hypnotized before the glaring eye and return only on its removal.

How often have we worked hard, hard and earnestly and patiently for the picture we know the face before us contained, but has disappeared to return only and immediately after the exposure is made and promptly and successively disappear at each attempt.

The camera is largely responsible more or less directly and its distracting gaze must be obscured from the sitter before one can hope for better results.

The ability of the operator to eliminate the camera measures largely the extent of success as a portrait worker. We are here speaking in the figurative sense and by no means imply that the camera should be barricaded behind palms, nor peering from between curtains. One could not successfully ambush their subject in this way.

The camera may and should be in full view, the operator can render it, invisible and harmless at least so momentarily at the psychological time. The subject can be so handled that the camera does not occupy the attention or thought and when this has been accomplished the operator has eliminated the greatest foe.

The qualifications necessary to the making of a portraitist who is to stand high in the profession are varied and of finely drawn distinctions and the degree attained in one measures the success in the other. Essentially among these are knowledge and personality; a pleasing personality of the true host or hostess and maintaining this position to the degree necessary and as a means to an end.

Having the floor so to speak one may lead here and there

FORREST SCENE. Theodore Eitel.

and find an interesting topic of conversation. A lawyer most likely is not only interested in law may even be not most interested, at least a diversion in the proper direction would be agreeable; A merchant may be interested outside of commercial life; The business man can be made to forget temporarily the strife and wear of competition and the manufacturer the noise of wheels. And so on through the varied lives with which one comes in contact.

Find an agreeable topic and when this is accomplished negatives may be made as fast as desired.

When relating some incident or remark or when answering a question, the operator as he approaches the climax of a sentence, opens the shutter and without hesitation in speech finishes the sentence; the subject during this interval is more steady than if clamped in irons and at the same time have a natural easy poise vibrating with personality and will have an expression almost exuding the thoughts of the subject.

This operation may be repeated successively many times and except the sitter be versed in the method of work will not realize that exposures are being made.

I recall instances where after a lapse of probably twenty-five minutes a client would show signs of uneasiness at the delay and would be delightfully surprised to learn that his part of the task was finished.

After treatment in this manner one's client will leave the studio pleased and believing in you, they continue to believe in you and come to you the next time; and they tell their friends about you. When they think of photographs they think of you; you have rendered a service to a people and earned a reward which cannot and will not be denied you.

CINEMATOGRAPHY FOR LOCAL PHOTOGRAPHER

By ALFRED H. SAUNDERS

AGAIN, the request has come to supply a little information to the many readers of *The American Annual of Photography,* so without any further circumlocution I will assume the camera has been purchased, and that the question of the film, which now claims our attention, has been solved. It is time to go ahead and experiment, but here arises a point and a question—which film is the best to use? There are on the market today several manufacturers' products. First, and foremost, the Eastman Kodak Company's brand, which is so well known and largely used. The Lumiere Company and the Austin-Edwards are all available for use. In a little while the Ansco will have an excellent brand of cinematography film on the market, so that the photographer will have a wide range to choose from, and to experiment with, using his own discretion as to the brand he will adopt. The next process is threading the film in the camera box. This, of course, is done in the dark room, and carried out and placed in the camera, threading up as explained and illustrated in previous article.

The most critical period has now arrived; the question of exposure is one that is going to puzzle the photographer for a little while, in addition with the turning of the crank at the proper ratio of speed, if a few hundred feet are spoiled in this experiment, and experience is gained, it will well pay for the money spent.

Having exposed your film, the next step is the development of the tests. Now comes the difference in manipulation to the ordinary dry plate. We have 200 feet of film ribbon to handle, and how are we going to do it? Are we going to develop by tank or tray? It would be well here, for those intending to take up the work to write to Corcoran Company, New York, for the price lists of tanks and developing racks; to Eberhardt Schneider for catalogue of amateur outfit for the Cinematographer; to C. Francis Jenkins, Washington, D. C., for his

KENNETH. CLARISSA HOVEY.

collapsible pin rack. Tanks, for the professional manufacturer who is turning out a large quantity of film each day are most suitable, but for the superficial worker the tray system is best. I have made trays from wood and lined them with the ordinary table oilcloth and they have answered admirably to develop from one to two hundred feet of film with the least quantity of developer.

The racks used in the development can be lifted bodily from the tray, washed and placed in the fixing bath, again washed and dried, or, if the film is to be toned, can be placed direct into the tray of toning solution, again washed and dried. It is to be presumed the tyro will take the text books issued by each manufacturer of film, as his guide for the development of that special film, the maker knows the emulsion they are using, its properties, and the results obtained from it when a certain developer is used.

The Eastman, Lumiere and G. Gennert Companies issue instruction books, the Berlin Aniline Works also publish a very valuable booklet—"The Agfa Book of Photographic Formulæ". Mr. Barrows of that firm supplied me with the following developers which have been well tried, and successful in photographic work:

GLYCIN DEVELOPER.

Distilled Water	60 gallons
Sulphite Soda	½ pound
Carbonate Soda	2 pounds
Glycin	½ pound
Time	20 minutes
Temperature	70°

and the well known

METOL HYDROQUINONE DEVELOPER

Water	66 gallons
Agfa Metol	1 2/3 ounces
Agfa Hydro	2½ ounces
Sodium Sulphite (Crystals)	3½ pounds
Potassium Carb. (C.P.)	1¾ pounds
Potassium Bromide	½ ounce

Dissolve in half the water *hot;* add balance of water cold.

TIME AND TIDE DEFYING. J. M. Whitehead.

In my experiments with one or two tests of each make, I found the above two developing formulæ work very satisfactory, several brands of film were used, indiscriminately one after the other in the tank.

The Lumiere people give for their film the following stock formulæ:

NEGATIVE DEVELOPER

Hot Water	6 gallons
Lumiere's Methynol	1 ounce
Hydroquinone	2 ounces
Sulphite Soda (dry)	32 ounces
Carbonate Soda (dry)	32 ounces
Bromide	360 grains

To develop take one part stock to two parts water, temperature 65° F.

POSITIVE DEVELOPER

Hot Water	6 gallons
Lumiere's Methynol	1 ounce
Hydroquinone	2 ounces
Sulphite Soda (dry)	32 ounces
Carbonate Potass.	12 ounces
Bromide	½ ounce

To develop take one part stock to one part water, temperature 65° F.

They, in their instruction, make very good suggestions, which I have often carried out in my experiments, with dry plates, film packs and Cinematograph films; namely:—soaking the film for five minutes previous to development, in a solution containing one pound carbonate soda (crystals) to every 16 gallons of water. It is astonishing what good results are obtained with any make of film or plate by using this solution. I will be glad to get the experience of my readers regarding the results they obtain by the various developers used. There is a formulæ that has never yet been given to the public, one that has been in active use for the past twenty years with very little variation in the results obtained, and for all round work can be fully recommended. I call it the Cinematograph Developer of the Pioneers of the Industry:

Common table salt	5 grs.
Chloride Cobalt	5 grs.
Carbonate Soda	5 oz.
Sulphite Soda	5 oz.
Metol	½ oz.
Hydroquinone	½ oz.
Water	1 gallon

The above developer can be used repeatedly for all kinds of plates, film and paper in addition to the cinematograph film. For Cinematography it is well to use it as given without any dilution. It may be utilized for plates under-exposed by taking one ounce of stock and adding two ounces of water. For paper take one ounce of stock and four ounces of water.

A SONG OF THE SEA. CHAS. W. DOUTT.

BORN'S LAKE, COLORADO. GEORGE L. BEAM.

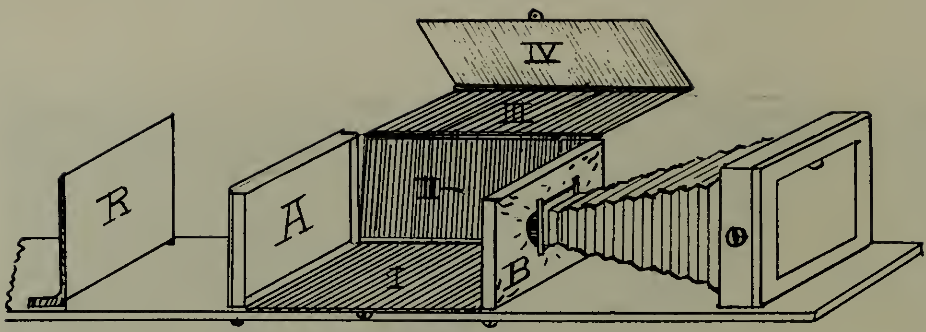


Figure 2.
Illustrating article "Photographing in a Factory," by Henry Bowe.

PHOTOGRAPHING IN A FACTORY

By HENRY BOWE

SINCE the advent of photography its uses have multiplied year by year until at the present day its benefits are unlimited.

It is my purpose in this article to elucidate a few points of the benefits derived from the camera in the factory. There is hardly a business today that is not using a camera in one way or another. Large corporations have an official photographer whose duty it is to record photographically all and everything from the machinery, etc., to an accident.

A special apparatus is not always necessary. I have used a pinhole to advantage in exceptional cases. My Premo has always been used when "taking" machinery, copying, etc. One advantage is its quickness in getting a design or copy of a loaned article where the time is limited, which is of great value to the designer. The design can be enlarged as in the case of lace patterns (Figure 1), scroll work, etc., and finished to suit after the article has been returned.

In photographing machinery, models, etc., the background if not in harmony with the subject is blocked out on the negative, or routed out in the type blocks if for catalogue purposes. While this may do in smooth outlines, it can not be done quickly and properly with small and intricate articles like jewelry, clock works, etc., which is generally copied exact size. Therefore, a direct method for white backgrounds without shadows is by far preferable.

Figure 3.

The method used is the ground glass background with a light-tight sleeve or hood to fit between the camera and the glass frame. The sketch (Figure 2) here shown describes it almost without words. A smooth board one inch thick the length required by the size and focal length of your camera is the first thing required, to which the ground glass frame A and the opposite frame B are securely fastened with screws from underneath. The distance from A to B is the length required for copying exact size. The frame B has a black piece of velvet fastened securely on one side, but loosely so it can be moved back or forth a few inches when the lens is pushed through a hole in its center.

The sleeve (1, 2, 3, 4) can be made of stiff cardboard with cloth hinges and stained inside a dead black. When closed around the frame A.B. it must be light-tight. A white reflector (R.) to stand behind the ground glass, and a piece of white cardboard to cover (I) when open is also needed.

The article to be copied is fastened on the front of the ground glass with a little wax. The sleeve is opened and thrown back, the reflector adjusted to the proper angle, the camera focused, and the exposure made. Now close up the hood (1, 2, 3, 4) tight and expose for the background. A little experimenting will put you right. When arc lights are used they will have to be movable so as to change from front to rear light. When there is too much vibration it can be obviated by hanging the complete outfit from the ceiling with stout cords or wire. Some prefer the apparatus upright and fasten the baseboard to the wall near a window. Use a slow plate and develop for a clear crisp negative which is suitable for reproduction and for blue print or platinum.

The antique aztec pendant (Figure 3) was copied without any apparatus except a twenty-five cent copying lens used over the regular lens, and while not by any means perfect is far better than pen or pencil would have done in the time available.

Figure 1.
Illustrating article "Photographing in a Factory," by Henry Bowe.

THE CRUISE OF THE ELSIE ALLEN. A. F. MUHR.

WANTED—A UNIFORM SYSTEM OF PLATE TESTING

By E. J. WALL, F.R.P.S.

IT is curious that here in America, the birthplace of popular photography, the country that has done more than any other to place within the reach of the world's people the means of making photographs at low cost, there is absolutely no recognised system of testing plates. Every maker adopts some system of his own and marks his plates 'slow', 'fast', or 'extra fast' and gives in his booklet the ratio of these speeds—more or less correctly. But if one wants to try the plate of another maker there is absolutely no relation between the designations of the two makers, nor can one translate the one into the other without actual trial.

As an excellent example of the extraordinary want of system now extant, I will cite the following case. A plate maker issues three fast plates, that I will call 1, 2, and 3, and states that the ratio of their speeds is 1, 1½, 2½. The actual speeds are 1, 2½, 1¾. What system is adopted by this maker for testing in his factory I do not, of course, know but I can give a very good guess. Plate 2 is really a fast plate, which gives exceptionally high density and works very cleanly. Plate 3 is what is generally known as a soft working plate. It will not give great density and naturally forcing it produces fog, the result being that nine out of every ten users would say that it was the faster plate of the two, and assume that the negatives were overexposed, whilst the real trouble is that this plate has not got the 'guts' and therefore though of lower speed looks the faster.

In the studio plate 3 seems the faster because it does not give blocked up high lights nor very clean shadows. The result being that in the hands of the average operator the latter plate will give the better print, although if the operator knew enough plate 2 would enable him to actually cut down his exposures if he only knew how to manipulate this plate properly.

PORTRAIT. B. J. Falk.

In England the Hurter and Driffield system has been almost universally adopted for speed testing, whilst on the continent of Europe the Scheiner system is used. On theoretical grounds, into which we need not enter, the latter is defective. The former system is also defective unless used strictly according to the rules laid down by Hurter and Driffield.

The grave trouble ahead of the adoption of any common system is that, without a universally recognised centre that shall be responsible for the checking of the readings, we might very soon obtain precisely the same state of affairs, which is now prevalent in England, that is to say, whilst the H. & D. system is used by all, yet every maker adopts his own particular method of reading the results. The consequence of this is that a plate may be advertised as possessing a speed of 350, whereas actually it is about 200.

This trouble, of course, is due to the fact that plate users have acquired the idea that a high speed plate is the best, and makers feeling this have just boosted their numbers in the hope of making greater sales.

This bubble of speed can be at once pricked if the user will recognise that his negative is merely the means to an end and that end—the print. If with a given method of working a particular plate will give the most satisfactory result, and it is perfectly immaterial whether the printing process be carbon, platinum or a development paper, then the speed of the plate is absolutely a minor point.

Now if this statement be true then a uniform system of plate speed testing is absolutely valueless. Nor can this be denied. The speed of a plate is not its only quality. What we want is a uniform system of plate testing that will give us the speed, the contrast obtainable, the fog or absence of fog, and the color sensitiveness in absolute units so that every user can at once choose the plate that is the most suitable for his work.

Whether plate makers generally would accept the readings of such a central testing establishment is open to question. Some undoubtedly would whilst others would not, but the plate user would soon force even the most stubborn to fall into line because after all it is the plate user that controls the maker and not vice-versa.

ALONG PICTORIAL LINES

By CHARLES STILLMAN TAYLOR

THAT there is such a thing as correct exposure in pictorial photography, most camera workers will agree, and while it is an excellent quality to strive for, "correct exposure" by no means implies that every negative should show the same range of light and shade and be of the same relative density.

In taking two views under similar conditions—the one having strong contrasts, ranging from deep shadow to white—the second showing relatively small contrasts of light and shadow with less violent contrasts between the high lights and the shadows—it is possible to secure almost approximate density in each, by modifying the development. Many workers endeavour to do this, and if the end justifies the means, well and good, but it is obviously not "correct exposure", because if the one subject is correct, the second must be improperly timed. This brings us to the only sane and satisfactory method and that is to regard the subject as of the first importance, and to give the negative the correct time to produce the pictorial effect which we see and admire.

The pictorial photographer must learn to critically judge and analyze the actual contrasts of light and shadow. If the pictorial arrangement of nature satisfies us, then we should time the exposure to reproduce that which lies before us. If we wish to increase or reduce the contrasts, we must modify the exposure to give the desired balance. In other words, we cut down exposure to the minimum to increase and give as much time as possible without fogging to reduce contrasts.

The question of color contrasts must, of course, be considered also since it is an important factor in correct exposure. For instance, when viewing a red brick building in a setting of green lawn and trees, the red will over-power the green and we, therefore, note the red more quickly than the more quiet green. Now, if it is our desire to portray a bright red

GRANDFATHER'S COURTING DAYS. KATE MATTHEWS.

building amid the quiet green surroundings, we will aim to time our exposure to accentuate the red building and lower the green. A similar problem confronts the photographer when photographing red flowers against the green leaf background. It is the subject we should consider first—we desire to bring out the red and subdue the green of its foliage. The logical equipment for achieving our desired result is to employ plates which are sensitive to the red rays, and a proper color screen to transmit these rays to our plate. Here again, must the exposure be modified to record our impressions.

The pictorial photographer being alone interested in depicting the pictorial as distinguished from the actual view, it is often desirable to subordinate much confusing detail found in the nature view that we may show broad effects.

Leaving out the consideration of focus, and stops, as outside the pale of our subject—exposure—we find that a minimum exposure will assist us in pruning out the undesirable detail from the shadows, but brings the detail in the high lights out more prominently. This is well illustrated when we make a brief exposure to secure a cloud effect; we secure detail in the brilliantly lighted sky, but the foreground detail will be completely shut out. When detail in both light and shadow are wanted we must observe the special conditions and modify the exposure to render the effect wanted.

Whenever the suggestion of movement is desired—as flowing water, breaking waves and so on, a brief exposure is obviously not correct, because we lose all effect of motion. The tumbling water of the cascade loses all its charm if we photograph it with a short exposure and portray the quick water like so much frozen foam—all hint of motion is thereby lost and the very life and action of the subject—the quality which we most admire and wish to record in our view is lost. When we view a subject of this kind the eye changes its focus to blend several views of the one scene into one general impression and this is the pictorial rendering we seek. The lens, on the other hand is much more rapid and being focused upon but one object, a brief exposure will only record the one position and the resulting print will be a technically good treatment, perhaps, but altogether lacking in pictorial qualities. As the eye of the pictorial photographer in reality blends several

ARDMORE. Heinrich Krebs.

different positions into one impressionistic view, it follows that we must allow sufficient exposure to secure the requisite life and movement in our subject. Movement does not imply considerable blurriness however, but an adequate exposure to depict the subject as we see it from a picture making standpoint.

A certain allowance must, of course, be made in calculating the correct exposure for all moving objects. The rapidity of movement, distance of the object, and the condition of the light and shade are the important factors to be considered. In landscape work, and with a lens of fairly long focus a good rendering may be secured by giving an exposure of about one-twentieth of a second. This is merely a suggestion, however, since the artistic perceptions of every individual differ greatly and exposure must be modified to delineate the particular effect desired.

The sentiment which any given subject suggests in the mind of the camerist, as worthy of portrayal, is the chief ruling factor in pictorial representation. The actual scene may or may not coincide with the effect we wish to reproduce. In the majority of cases it does not. Suppose when viewing a charming bit of nature we are at once captivated by the impression which it suggests of light and winsome spring. We desire lightness and delicacy and warmth, but the day may be dull and sombre, and to avoid making another visit to the scene, we must time the exposure to secure a good normal negative under existing conditions, then we can make use of our printing medium to lighten up and subdue the important details of our view.

In development we have a reasonably flexible process for modifying the character of the picture, providing the plate is not badly under-exposed. Full exposures must be aimed for, for under-exposure with its lack of necessary detail cannot be coaxed to produce a satisfactory negative, however skillfully development and printing is handled. Every mechanical aid, as exposure tables, timing methods of development and so on, are only useful when supplemented by good judgment on the photographer's part; the worker must first understand what he desires to portray, and then call into being all his skill to produce this effect.

Exposure and development should not be looked upon as widely different operations, but rather considered as forming the two parts of a perfect whole and that is the perfect negative. Correct exposure is essential, but no more so than correct development, since perfect results can only be had by the worker who is equally skilled in both processes, unless the photographer is content with snap shot memoranda views. Pictorial photography is made up of many small details and the most important by far are correct exposure and correct development.

SUNLIT PASTURE. HERMAN GABRIEL.

SUPPLEMENTARY LENSES

By A. LOCKETT

THE photographer seldom cares to carry a battery of heavy lenses, of different foci, even when fortunate enough to own them. It will, thus, often come to pass that the lens doing duty on his camera proves unsatisfactory for the particular work in hand. It is of too short a focus, perhaps, when he cannot approach near enough to his subject; or may be the contrary is the case, and it is of too long a focus when circumstances do not permit him to get to a sufficient distance.

At such times, the worker begins to wish vaguely that he possessed some sort of supplementary lens, to shorten or increase the focal length of the camera objective, though too many photographers have but a misty idea of the exact function of this auxiliary and the manner in which it should be used. Two or three supplementary lenses of various foci, contained in a small case, weigh scarcely anything, yet they wonderfully increase the worker's scope and render him superior to many otherwise awkward difficulties. Useful sets of supplementary lenses to fit on the front of the camera lens are in the market at very reasonable prices, and those who can are strongly advised to procure one. The present article, however, is mainly intended to show how such lenses may be cheaply extemporised in an emergency.

Suppose, for example, we are photographing a shop-front and the street is too narrow to get far enough back to include the whole of the window. Clearly, we need a lens of wider angle, that is to say, of shorter focus. A convex or positive supplementary lens to reduce the focal length of the camera lens may be readily improvised from a reading glass, a sufficiently large magnifying glass, a monocle, or even a spectacle lens. It must be a primitive place where one or other of these cannot be obtained. The question then arises, what focus will be required?

This may be arrived at by examining the image of the shop-window on the focusing screen, and judging how much smaller in scale the part shown will have to be in order to include the whole of the window. Thus, suppose we see only about one-half of the window on the ground glass. Evidently, this needs to be reduced to one-half of its present linear size before we can get the entire window into the photograph.

Now, the size of the image, or any part of it, is always directly proportional to the focal length of the lens. Therefore, if we want an image only half the size, we must employ a lens half the focal length of the one at present on the camera.

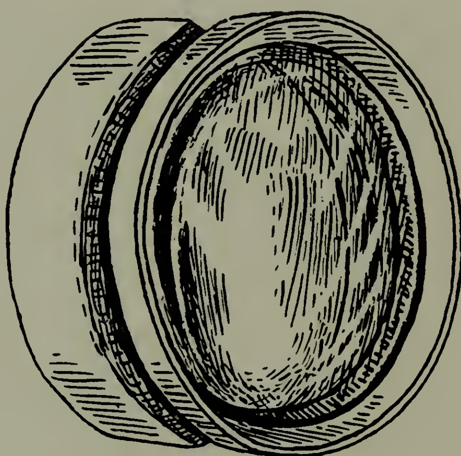


Figure 1.

Here we may bear in mind the useful fact, that to halve the focus of any lens a convex supplementary lens of the same focus may be used. If the camera lens is of 8 inches focus, a positive supplementary lens of 8 inches focus placed as close as possible in front of the former, will reduce the focal length to 4 inches. Strictly speaking, the two lenses should be in contact. A slight separation, however, will make but a trifling difference in the combined focus—it will be, in fact, a little over 4 inches.

It now only remains to find the most convenient way of fixing up the supplementary lens. This will naturally differ according to the kind of glass obtained and the size of the camera lens itself. Sometimes the lid of a box that has held an upright incandescent gas mantle may be of just the diameter to slip on the lens hood. The glass may be of a size to fit closely in the lid without fastening, otherwise it may be secured

inside by means of glue, sealing wax, stamp edging or sticking plaster. Before inserting the glass, a circular opening about ¼ inch less in diameter is cut in the bottom of the lid.

Another method is to take one of the boxes supplied with inverted mantles, which usually have a crease or depression near each end. A portion about ¾ inch wide is marked off round one end with a pencil, and the line is scored through with a sharp penknife till a ring of the shape shown by Figure 1 is obtained. The supplementary lens can then be

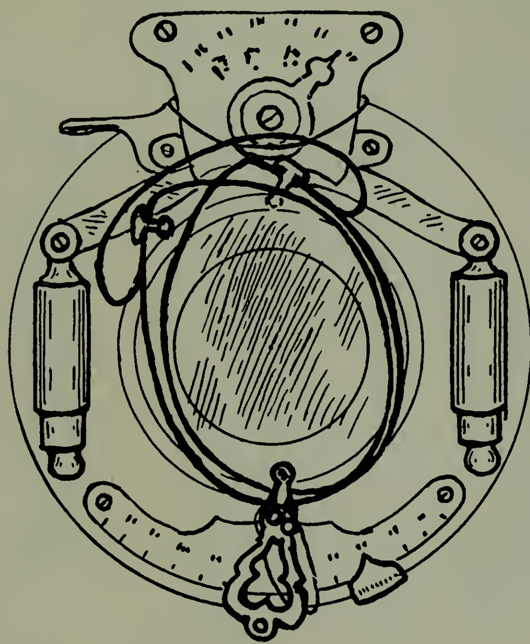


Figure 2.

glued in the front as illustrated, resting on the inner ledge formed by the crease, while the back part of the ring will fit on the camera lens like a cap. Useful rings may also be cut from cardboard postal tubes, which are procurable in various diameters.

A closed pair of folders may be temporarily bound to a diaphragm shutter, as illustrated in Figure 2, by a few turns of the fine wire used for tying flowers. This is passed through the spring, round the back of the shutter and across the part that takes the eye-glass cord. The two glasses together will, of course, be only half the focus of a single glass.

A reading glass makes a very acceptable supplementary lens. This may be lashed in front of the ordinary objective by

means of string or wire, tied first to the handle, then carried across the margins of the glass, round the lens tube, and perhaps also over the camera front. With a few trials it will be found that the glass can be tightly secured so as to be in line with the centre of the camera lens. It does not matter if the glass is a good deal bigger than the lens, on the contrary it is an advantage to use only the central portion.

A monocle, or other circular glass of suitable size may sometimes be inserted at the position of the diaphragm, as

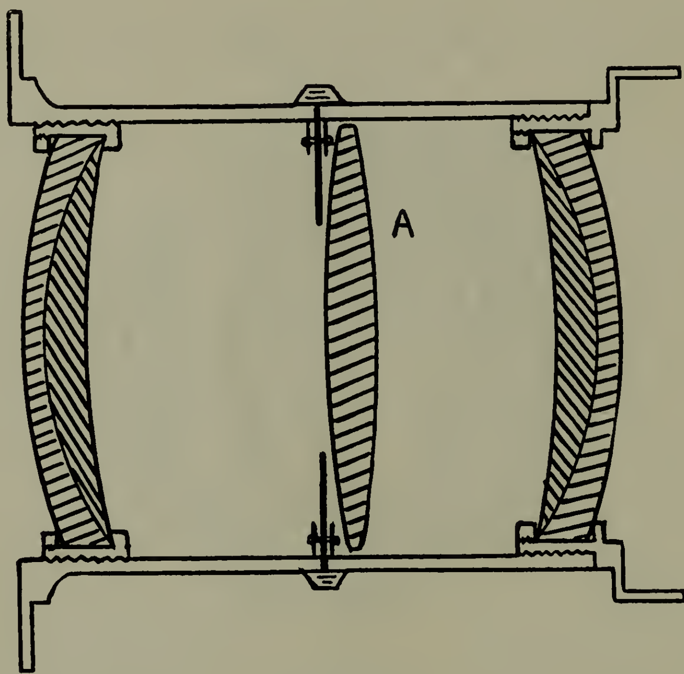


Figure 3.

shown at A in Figure 3, by unscrewing and replacing the front combination.

The following rhyme gives in a form easily memorised the rule for calculating the focal length of supplementary lens necessary to obtain any desired focus with any given camera lens:—

Multiply focus wanted by focus possessed by you,
Then divide the product by the difference 'tween the two,
Quotient gives supplementary needed the work to do.

To reduce the focus a convex or positive lens must be employed, while to increase the focus a concave or negative lens

A MOUNTAIN LAKE—KNIGHT'S ID., ALASKA. P. S. HUNT.

is necessary. As a typical instance of when a concave supplementary lens is useful, suppose we are photographing a statue from outside a railed enclosure, and can only get it about one-third the desired size with a 4 inch focus lens. We evidently require a lens of three times the focus, that is to say, 12 inches. Multiplying the "focus wanted", 12, by the "focus possessed", 4, gives 48. The difference between the two foci, 12 — 4, is 8; and dividing 48 by 8 we get 6 inches as the focus of the concave supplementary lens which will do what is required. Naturally, a longer extension is needed.

On page 129 will be found a handy Table of Lens Combinations. If the preceding facts have been intelligently followed, the method of using it will be readily grasped. A few examples may, however, be quoted.

(1) With a given camera lens and a convex supplementary lens of known focus, it is wished to find the combined focal length.

— Look for the focus of the camera lens in the column headed "Longer Focus", and for the focus of the supplementary lens in the lowermost row of figures. Then, where a horizontal line from the first meets a vertical line from the second will be found the combined focus. Thus, with a camera lens of 6 inch focus and a convex supplementary lens of 9 inch focus, the combined focus is 3 3/5 inches.

(2) With a given camera lens it is desired to shorten the focus. What focal length of supplementary lens will be necessary?

— Look for the focus of the camera lens in the column headed "Longer Focus", and follow the horizontal line from that figure till the nearest approximation to the required lessened focal length is found, among the columns headed "Shorter Focus". Then, vertically below the latter will be seen the necessary supplementary lens. Suppose, for instance, it is required to shorten a 10 inch focus lens to 3 inch focus. Having found 10 in the column headed "Longer Focus", the nearest approximation to 3 in a horizontal line from the former figure is 2 6/7, and vertically beneath this, in the row headed "Supplementary Lens", we find 4 inches, as the focus of the necessary convex glass.

TABLE OF LENS COMBINATIONS

Longer Focus	Shorter Focus													
16	$2\frac{10}{19}$	$3\frac{1}{5}$	$3\frac{17}{21}$	$4\frac{4}{11}$	$4\frac{20}{23}$	$5\frac{1}{3}$	$5\frac{19}{25}$	$6\frac{2}{13}$	$6\frac{14}{27}$	$6\frac{6}{7}$	$7\frac{5}{29}$	$7\frac{7}{15}$	$7\frac{23}{31}$	8
15	$2\frac{1}{2}$	$3\frac{3}{19}$	$3\frac{3}{4}$	$4\frac{2}{7}$	$4\frac{17}{22}$	$5\frac{5}{23}$	$5\frac{5}{8}$	6	$6\frac{9}{26}$	$6\frac{2}{3}$	$6\frac{27}{28}$	$7\frac{7}{29}$	$7\frac{1}{2}$	$7\frac{23}{31}$
14	$2\frac{8}{17}$	$3\frac{1}{9}$	$3\frac{13}{19}$	$4\frac{1}{5}$	$4\frac{2}{3}$	$5\frac{1}{11}$	$5\frac{11}{23}$	$5\frac{5}{6}$	$6\frac{4}{25}$	$6\frac{6}{13}$	$6\frac{20}{27}$	7	$7\frac{7}{29}$	$7\frac{7}{15}$
13	$2\frac{7}{16}$	$3\frac{1}{17}$	$3\frac{11}{18}$	$4\frac{2}{19}$	$4\frac{11}{20}$	$4\frac{20}{21}$	$5\frac{7}{22}$	$5\frac{15}{23}$	$5\frac{23}{24}$	$6\frac{6}{25}$	$6\frac{1}{2}$	$6\frac{20}{27}$	$6\frac{27}{28}$	$7\frac{5}{29}$
12	$2\frac{2}{5}$	3	$3\frac{9}{17}$	4	$4\frac{8}{19}$	$4\frac{4}{5}$	$5\frac{1}{7}$	$5\frac{5}{11}$	$5\frac{17}{23}$	6	$6\frac{6}{25}$	$6\frac{6}{13}$	$6\frac{2}{3}$	$6\frac{6}{7}$
11	$2\frac{5}{14}$	$2\frac{14}{15}$	$3\frac{7}{16}$	$3\frac{15}{17}$	$4\frac{5}{18}$	$4\frac{12}{19}$	$4\frac{19}{20}$	$5\frac{5}{21}$	$5\frac{1}{2}$	$5\frac{17}{23}$	$5\frac{23}{24}$	$6\frac{4}{25}$	$6\frac{9}{26}$	$6\frac{14}{27}$
10	$2\frac{4}{13}$	$2\frac{6}{7}$	$3\frac{1}{3}$	$3\frac{3}{4}$	$4\frac{2}{17}$	$4\frac{4}{9}$	$4\frac{14}{19}$	5	$5\frac{5}{21}$	$5\frac{5}{11}$	$5\frac{15}{23}$	$5\frac{5}{6}$	6	$6\frac{2}{13}$
9	$2\frac{1}{4}$	$2\frac{10}{13}$	$3\frac{3}{14}$	$3\frac{3}{5}$	$3\frac{15}{16}$	$4\frac{4}{17}$	$4\frac{1}{2}$	$4\frac{14}{19}$	$4\frac{19}{20}$	$5\frac{1}{7}$	$5\frac{7}{22}$	$5\frac{11}{23}$	$5\frac{5}{8}$	$5\frac{19}{25}$
8	$2\frac{2}{11}$	$2\frac{2}{3}$	$3\frac{1}{13}$	$3\frac{3}{7}$	$3\frac{11}{15}$	4	$4\frac{4}{17}$	$4\frac{4}{9}$	$4\frac{12}{19}$	$4\frac{4}{5}$	$4\frac{20}{21}$	$5\frac{1}{11}$	$5\frac{5}{23}$	$5\frac{1}{3}$
7	$2\frac{1}{10}$	$2\frac{6}{11}$	$2\frac{11}{12}$	$3\frac{3}{13}$	$3\frac{1}{2}$	$3\frac{11}{15}$	$3\frac{15}{16}$	$4\frac{2}{17}$	$4\frac{5}{18}$	$4\frac{8}{19}$	$4\frac{11}{20}$	$4\frac{2}{3}$	$4\frac{17}{22}$	$4\frac{20}{23}$
6	2	$2\frac{2}{5}$	$2\frac{8}{11}$	3	$3\frac{3}{13}$	$3\frac{3}{7}$	$3\frac{3}{5}$	$3\frac{3}{4}$	$3\frac{15}{17}$	4	$4\frac{2}{19}$	$4\frac{1}{5}$	$4\frac{2}{7}$	$4\frac{4}{11}$
5	$1\frac{7}{8}$	$2\frac{2}{9}$	$2\frac{1}{2}$	$2\frac{8}{11}$	$2\frac{11}{12}$	$3\frac{1}{13}$	$3\frac{3}{14}$	$3\frac{1}{3}$	$3\frac{7}{16}$	$3\frac{9}{17}$	$3\frac{11}{18}$	$3\frac{13}{19}$	$3\frac{3}{4}$	$3\frac{17}{21}$
4	$1\frac{5}{7}$	2	$2\frac{2}{9}$	$2\frac{2}{5}$	$2\frac{6}{11}$	$2\frac{2}{3}$	$2\frac{10}{13}$	$2\frac{6}{7}$	$2\frac{14}{15}$	3	$3\frac{1}{17}$	$3\frac{1}{9}$	$3\frac{3}{19}$	$3\frac{1}{5}$
3	$1\frac{1}{2}$	$1\frac{5}{7}$	$1\frac{7}{8}$	2	$2\frac{1}{10}$	$2\frac{2}{11}$	$2\frac{1}{4}$	$2\frac{4}{13}$	$2\frac{5}{14}$	$2\frac{2}{5}$	$2\frac{7}{16}$	$2\frac{8}{17}$	$2\frac{1}{2}$	$2\frac{10}{19}$
	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Supplementary Lens

(CONVEX TO SHORTEN, CONCAVE TO LENGTHEN)

(3) It is wished to increase the focus of a given camera lens. What focus of concave supplementary lens will be needed?

— Look for the increased focus desired in the column headed "Longer Focus", and follow a horizontal line from that figure till the focus of the camera lens, or the nearest approximation to it, is reached, among the columns headed "Shorter Focus". Vertically below this will be found the necessary focus of the concave supplementary lens. For instance, it is desired to lengthen the focus of a 4½ inch camera lens to about 10 inches. Looking for 10 in the column headed "Longer Focus", the horizontal line from this is followed till the nearest approximation to 4½, that is to say, 4 4/9, is reached. Vertically beneath that figure will be found 8, the required focal length of the concave supplementary lens.

(4) With a given camera lens and a given concave supplementary lens, what is the combined focus?

— Look for the focus of the concave glass in the bottom row of figures, headed "Supplementary Lens", and follow a vertical line upward from this till the nearest approximation to the camera lens is met with. On a horizontal line with the latter, in the column headed "Longer Focus", will be found the combined focal length. Thus, with a camera lens of 5½ inch focus and a concave supplementary lens of 12 inch focus, what is the combined focal length? Looking for 12 in the bottom row of figures, we trace a vertical column upward till the nearest approximation to 5½, that is to say, 5 5/11, is reached. Horizontally in line with 5 5/11 in the column headed "Longer Focus" will be seen 10 inches, the increased focal length.

And now to consider the question of separation, though, as before stated, for ordinary purposes this may very well be ignored. A memory rhyme, enabling the effect of any degree of separation between two lenses A and B to be ascertained, is as follows:—

Multiply A by B, a simple calculation;
Then divide by A plus B, minus separation.
Quotient gives the focal length of the combination.

Thus, suppose a camera lens of 6 inch focus is to be used in conjunction with a convex supplementary lens of 5 inch focus,

PORTRAIT.

ALBIN STUDIO.

there being a separation of 1 inch between the two. Then, 6 multiplied by 5 is 30, 6 plus 5 is 11, and 11 minus 1 is 10. Finally 30 divided by 10 is 3 inches, the combined focus.

In making the calculation with a concave glass, the plus or minus sign must be placed before each figure, according to whether it stands for a positive or a negative lens or quantity. Then, when multiplying or dividing two figures whose signs are alike the product or quotient will be plus, while if the signs are different the product or quotient will be minus. In adding two plus quantities the total is plus, while with two minus quantities the total is minus. When adding plus and minus, however, the difference between the two is taken and the sign of the greater figure is prefixed. In subtracting, the sign is changed from plus to minus before the figure subtracted and the two quantities are added according to the previous rules. Thus, suppose a camera lens of 4 inch focus is to be used with a concave supplementary lens of 10 inch focus, the separation being 2 inches. Then $+4$ multiplied by -10 is -40, $+4$ added to -10 is -6, and $+2$ subtracted from -6 is -8. Finally, -40 divided by -8 is $+5$, that is to say, the combination will be of 5 inch focus. Sometimes it is better to place the negative lens behind the camera lens, in which case a telephoto combination results.

Separation is not merely the distance between the surfaces of any two lenses, but has to be measured between their optical centres, or rather from the node of emission of the first lens to the node of admission of the second. It has been stated that when a supplementary lens is placed at the diaphragm of a rectilinear the position of maximum contact has been secured, but this is a mistake, though the arrangement is, as a rule, that least likely to upset the corrections of the objective. For further information regarding the measurement of nodal separation an optical treatise should be consulted.

The employment of a supplementary lens alters the value of the stop. The new f number may be found as follows:—Divide the stop by the original focus, and multiply the quotient by the combined focus. For instance, suppose an original focus of four inches is increased to 6 inches, then f/16 will become $\frac{16}{4} \times 6 = f/24$.

A STREET IN NEW CAIRO. A. R. F. EVERSHED.

Another use for supplementary lenses is when near objects have to be photographed or copying done with a camera having insufficient extension. Here a different rule comes into operation. This is, that if we first focus the camera lens for "infinity", the focal length of the necessary supplementary lens will be equal to the distance of the copy or object. Suppose, for example, it is desired to photograph an object 1 foot away with only a short extension. Having first focused the camera lens on anything distant, a convex supplementary lens of 1 foot focus is placed in front, when a sharp image of the near object will at once be obtained. The foregoing rule is useful also for portraiture or copying with a fixed-focus camera, using a supplementary lens, or "magnifier", of a focal length equal to the distance of the sitter or copy.

In conclusion, it may be remarked that when the focus of the camera lens is much reduced by the use of a supplementary glass it sometimes happens that the lens mount or hood cuts off part of the rays, which are of course spread out to a wider angle, the result being that the whole of the plate is not covered. Due care must be taken to detect and avoid this. A further hint is that as most spectacle lenses, reading glasses, etc., are uncorrected it will be as well to stop down somewhat. Contrary to what might be expected, they do not injuriously affect the definition—at least for ordinary purposes—so long as the increase or reduction of focus is not pushed unreasonably far. An exception must be made, however, in the case of some anastigmats, with which specially adapted supplementary lenses are necessary.

WINTER HAZE. J. R. PETERSON.

WHY PYRO—WHY TANK

By GEO. D. JOPSON

WHY PYRO.

"PYRO is so mussy—it stains the fingers, it stains the negatives, it does not make as pretty a negative as the certain by-product of coal tar I am using." I have listened to such argument—yes, foolish arguments each and every one of them. The resulting image from a coal tar development is gray and colorless and less dense than it looks with the alternative that the negative has to be developed beyond a point where it appears to have a full scale of gradation. The result is that this longer development blocks up the highlights and gradually cuts down the gradation with the final result that the print does not reproduce all that was originally seen in the object photographed.

Pyro, the good old standby, may have the faults first mentioned, but it has its one great redeeming feature. It can be depended upon to give a printable negative no matter how thin so long as all the details are developed out, and to give all gradations in the print that are seen in the negative.

The preservative generally recommended for a Pyro solution is oxalic acid. If meta-bisulphite of potassium is substituted, using seven times the amount of the potassium that is generally recommended of the acid, it will be found to be a better preservative and less apt to cause the disagreeable stains, although a slight pyro stain helps the printing quality of the negative.

As it is the print we show to our friends, or deliver to our customers, which is better, a print lacking gradations from a pretty negative obtained by a coal tar developer—a print of quality from a negative that is not so pretty—a pyro developed one? To sum up the question, the negative is the means to an end. We sell the prints, not the negatives.

INDIAN SUMMER. George S. Seymour.

In tray development one is prone to examine the plate too often. Some have termed tray development "tentative," and I consider it a proper term, for when one commences with the developing he is too apt to make it experimental by the too often examination of the progress of the development. No dark room light that possesses sufficient visual luminosity to work by can be considered entirely safe.

By working close to the light in order to watch the progress of the negative being developed, and by the numerous examinations of the same a partial reversal of the image is very apt to occur which is considered by some a lack of sufficient time in exposure, and by others a certain form of fog. With the tank it is altogether different. The developing solution is mixed at a certain temperature, and in a diluted form. The plates or films are "locked" in the tank air tight; therefore the one temperature is maintained and avoidance of oxidization by developer being exposed to the air through the process of development.

Whether overtime, undertime, or correct time, the development is completed at the expiration of a certain time when the plates can be transferred to the fixing bath without fear of fog or reversal of image.

Does some one say each negative requires individual treatment? That old theory has been proven a fallacy and it is surprising that such a superstition (for such it is) should exist in the enlightened (photographic) age.

Do you ask how can plates of different exposures be developed simultaneously in the same developer and obtain identical results? No! they can not. Neither can it be done tentatively. But in the tank the results will be of a better average and more uniform. If you do not know of the error in exposure in advance no amount of modifying of developer or addition of bromide of potassium will make a noticeable change in gradation after the image has appeared, for the film of the negative has already absorbed all of the solid chemicals it will hold, therefore there is no room left to take up the modified developer, or the added bromide.

Owing to the fixed temperature, slow action and protection from air and light a wider latitude is offered for producing

printable negatives even if extreme over and under exposures are developed in the same solution at the same time.

The tank system gives the most uniform results and has proven to be the most practical and only scientific method in which to develop, giving more even gradation when developing a large number of plates than is possible by any other method.

FORTUNE TELLING. GRETE BACK.

LILLISHALL ABBEY. REV. H. H. WILLIAMS.

EXPOSURE BY REVERSAL

By F. W. HILL

EXPOSURE is, undoubtedly, the keynote of photographic success, but what constitutes a proper exposure seems to be open to a good deal of individual opinion.

Now, to thoroughly understand exposure, let us first consider the action of light upon the silver bromide in the emulsion. Let us consider the silver bromide as being in a state of stress in a plate that has been unexposed to light. In this state, the ordinary developing agents have no reducing action whatever upon it, and prolonged development would result in nothing but stain from the developing agent. It is seldom, however, that any but a slow plate would be in a state of perfect stress, and usually a slight reduction would take place.

Now, if we expose this emulsion to the light for a very short interval, a part of the stress is removed and the developing agent will reduce a certain amount of the silver bromide. Given a longer exposure, more of the stress will be removed and more of the silver bromide reduced, up to the point where all the stress is removed and all the silver bromide is reduced, when a maximum density of deposit is secured. Now a further exposure cannot remove more stress or increase the density, but what it does do is to put the silver bromide again under stress and thereby reduce the density of deposit until, with prolonged exposure, it has again reached its first state of stress and is no longer reduced by the developing agent.

This is what is commonly known as the *reversal of the image,* and it is quite possible to so expose a plate in the camera that when it is developed it will produce a positive instead of a negative image.

Now, with a thorough understanding of the above facts, let us see how we can use them to our best advantage in securing a satisfactory negative. Let us consider a sunlit landscape,

THE BRIDE. O. C. Conkling.

with blue sky, white clouds, and dark green trees in the foreground. One one-hundredth of a second would be ample to secure a maximum deposit in both the blue sky and white clouds. Therefore, there would be no distinction between the two and our resulting print would show a blank white sky, while the dark trees in the foreground would be so entirely under-exposed that they would show little or no detail.

Now, let us expose this same view one-fifth of a second; twenty times as long an exposure will give beautiful detail in the dark foreground, the blue sky will be reversed more than the white clouds—blue being more active than white—and the resulting print will, therefore, show the white clouds against a darker sky, which is the way they appear to the eye. If the exposure be overdone, the resultant negative may be flat, due to too much reversal. Even so, a flat negative full of detail has possibilities, whereas a contrasty negative without detail in either high lights or shadows has none. By using a contrasty printing paper and a long exposure with a weak light, it is surprising how much contrast can be gotten from an apparently hopeless negative. I wonder if everybody knows how much difference the distance between the light and the printing frame makes. If some of those who are in the habit of printing all negatives a uniform distance from the light will try some of their thin and flat negatives three times as far away, and give them nine times the exposure, they may be surprised at the improvement in the resulting print.

But to return to our exposure. It will be seen that we have simply got back to the old maxim—expose for the shadows and let the high lights take care of themselves—but I have tried to make it a little clearer just why we can do this.

There are now on the market plates that do not reverse, but for ordinary work they do not seem advantageous to me, as I rely on this reversal to get the results which I desire.

DEVELOPMENT.

The most perfect exposure possible can very easily be ruined by improper development, and improper development usually means quick development with strong developer. This is a mistake. Weak developer will always give the best results with either over or under-exposure. Use plenty of water—it's

cheap. The writer's favorite formula is Pyro Acetone made as follows:

Pyro	30 grs.
Sulphite Soda (dry)	120 grs.
Water	12 oz.
Cramer's Acetone	40 minims

This is for tray developer and will develop in about six (6) minutes. For tank development the amount of water can be increased to 30 oz., and development will be about thirty (30) minutes. I have never used the *time and temperature method,* but always examine my plates from time to time even in the tank, as I do not believe that the best results can be secured by uniform development of all plates. Some need over-development to secure the best results, while others need under-development.

Despite the ordinary acceptance, I have not found bromide of potassium necessary or desirable in a developer, for anything except copying and line work, where all the contrast possible is desired. More water is a far better restrainer than bromide of potassium.

Of course, my method of exposing applies only to stationary subjects. With moving subjects, the rate of movement must of necessity determine the exposure and then we must get the best negative possible with the exposure given. However, instead of trying to see how short an exposure you can take a picture in—as most amateurs do—try the opposite and see how long an exposure you can give, and see if you are not better satisfied with your average results.

MOONLIGHT. F. W. HILL.

INDUSTRIES AND THE CAMERA

By J. A. ANDERSON

ASIDE from the purely technical, the subjects for the camera which are apt to take precedence, with most persons, are those which possess an element of human interest. What people are doing and, especially what they have done in the past, will always attract.

Ancient tombs are ransacked for relics of the industries of former centuries; Indian mounds are opened to discover weapons and utensils of the Red Men; Grandmother is questioned about the wheels and loom used by her in the home making of fabrics now replaced by the products of the factory; of all of which photographic records are eagerly sought.

Rapid changes in industrial methods, occurring under our own eyes, may well supply work for the camera. The work of the farm offers many opportunities. For instance, the sickle (Figure 1) has long since vanished as a harvesting tool, preceding the scythe and the cradle which now only appear where the more efficient machine cannot go.

Another prolific field for interesting photographic records is found in the constant changes in transportation methods. The fine trolley system in a certain great city, presents a striking contrast with a picture which the writer secured in that same city, a number of years ago, in which appears an old style street car, drawn by a single mule, all in sole charge of the driver, the passengers being trusted to deposit the fares in a handy box.

The heavy transportation of large districts was, at one time, conducted by the Conestoga wagon, of which trains miles in length could then be seen on the great highways. Now, one of these substantial vehicles is only seen on a picture card, or in specimens carefully preserved for more than a century, in the locality where the wagons were made and which gave them the name.

CRADLING OATS IN THE ADIRONDACKS. Figure 1.

Illustrating article "Industries and the Camera," by J. A. Anderson.

The Conestoga yielded to the canals, which were the approved carriers until these, in their turn, with a few notable exceptions, have taken their place with the vanishing industries, being almost supplanted by the speedier iron horse.

A canal passing near the residence of the writer was, within his easy recollection, a scene of great activity. Almost hourly a melodious call from the steersman's long tin horn, or a blast from his conch shell gave notice to the locktender of his approach. Now the boats (Figure 2) are few and far between, and the observer must be watchful who would see an occasional example of the old time craft in the process of passing a lock, under the leisurely supervision of the old locktender, while the mules that supply the motive power take luncheon from the every ready nose baskets.

These sights and many others connected with our industries may soon be things of the past. Opportunities of obtaining records of them are all about us, but may be soon beyond our reach. In Daguerreotype days invitation to the studio was extended in the motto "Secure the shadow ere the substance fade", a suggestion which may well be applied to our present subject.

The worker in this class of photography may put brains into it if he choose. It is worth the trial. He need not be unduly exercised by the sometimes really fine work of those whose flight has taken them into the "higher", impressionistic" atmosphere, even though he may have to dodge an occasional bomb dropped by one of them. He may even essay a flight himself, being watchful, of course, against tumbles which aviators sometimes get.

But, if all were aviators, the air might be too full for comfort and the world would suffer serious loss in the absence of the every-day work of the realist who has his footing on the solid earth.

NEARING THE LOCK. Figure 2.

Illustrating article "Industries and the Camera," by J. A. Anderson.

THE PROFESSIONAL AND THE HAND CAMERA

By HENRY ERLE COOPER

THE average professional photographer is usually, I am afraid, of a rather conservative nature, and is slow to adopt modern innovations and conveniences which are often very much to his advantage. A striking example of this occurs in the matter of hand-cameras. It would be interesting to know what percentage of the professional photographers are the possessors and expert users of efficient hand-cameras. My experience would suggest that the percentage would be a small one.

This neglect of an important branch of photographic work appears to me to be a serious mistake, for on many occasions the man with the hand-camera can obtain striking and difficult subjects which are impossible to the man who is handicapped with a tripod. And after all the result is the thing that counts. The public who afterwards view the work do not care whether or no the man who obtained the result had three sticks of wood under his camera or not. Whilst to the man who handles the camera to be rid of the encumbrance of a tripod gives an added pleasure to the work.

The only drawbacks are the uncertainty of what the result will be, and the small size to which one is limited. The first difficulty is one which rapidly disappears as proficiency is acquired until at last a good worker can guarantee ten good plates to the dozen; whilst the other objection of small size is one which is easily surmounted by the use of an enlarger.

To the photographer who is properly equipped enlarging is no more trouble than making prints by contact. If enlarging is a bother then steps should at once be taken to improve the enlarging facilities so that it is possible to walk into the dark-room and make an enlargement in the same time that it would take to do a bromide print. The result obtained should practically be indistinguishable from a direct print.

CHILD PORTRAIT. Knaffl & Bro.

What camera to use, and whether plates or films, are questions which are often asked. To the professional worker plates will undoubtedly prove the most satisfactory in the long run. Regarding the choice of a camera the problem is not so easy to solve; so many types and varieties, each making claim to possess some great advantage, are now on the market that the choice is a difficult one.

The focal plane and the reflex type appear to be the two forms that are most suitable for the professional worker, and each possess advantages that are not found in the other. The important point in both kinds is to make sure that they work smoothly, that there is no jar either from the shutter, or the mirror. This trouble is often to be found in the cheaper makes, and is not always absent in the best makes. The best plan to do is when buying to insist on having the camera on three days' trial, and during that time to test it thoroughly under various conditions, and at various speeds, expose at least one dozen plates in it, and after development examine them most carefully for any signs of movement, double, or blurred image. Reject any camera that gives any indication of these faults, as they are bound to get worse the more the camera is used. The one essential point in all cameras in order to obtain with certainty good results is that the photographer should be thoroughly used to his camera. Having obtained a good camera, stick to it, do not be persuaded to change it for some other kind. Remember that the camera will only do its best work when the man who uses it is well practiced with it, and a master of his tool.

An equally important question is that of the lens. The advance made during the past few years has been so great that a new power is placed in the hands of the hand camera worker. The large aperture at which the best of the modern lenses will work gives him many chances which are barred from the owner of an ordinary lens. It is important, however, to understand the limitations of a lens, for in no one lens are all the desirable qualities to be found.

As all the results obtained will probably require to be enlarged it is a good plan to get the subject well within the plate, and not crowd it up to the edge. The surroundings can easily be trimmed off when enlarging, but if the tail of a famous race

horse, or the head of some popular politician is missing, the rest is of little value.

Regarding the question of what class of subjects the photographer shall aim at, this is a matter which must be left to each man to settle, but it is an undoubted fact that there is a very large amount of business to be done by the man who can efficiently handle a hand-camera. It is particularly useful at all outdoor public events where large crowds assemble. It can also be used indoors at public meetings, etc., if rested on some steady object and a slow exposure given, but probably it will be found most useful when photographing animals. For cattle, horses, dogs, etc., it will in a very short time come to be regarded as invaluable. By its aid one is able to walk about, select the best position, and expose before the object, whether it is man or animal, is aware that they are under observation.

The photographer properly equipped with a good hand-camera holds a great advantage over his competitor who can only work off a tripod, and need never suffer the humiliation and loss of declining a commission because he is not able to do it.

MOSS BEACH DUNES. EDGAR A. COHEN.

READY FOR THE GAME. C. F. TOWNSEND.

THE WHYS AND WHEREFORES OF MOTION PICTURE FINISHING

By H. OLIVER BODINE

WHILE it is an extremely difficult matter to touch upon this subject in a limited amount of space, I have endeavored to give concise and non-technical information that would be of interest to the average person interested in motion pictures, and I trust that it will prove of interest and value to the readers of the "ANNUAL".

Motion picture film is supplied regularly in rolls of 200 and 400 feet each, wrapped in a double cover of black opaque paper and a single one of aluminum or tin foil, then placed in a metallic box and sealed with adhesive tape. A label is placed on the cover of the can designating whether the contents be negative or positive film, as well as the length of the roll contained therein and the emulsion number.

All film should be kept in its own packing even after same is perforated and in a cool and moderately dry place. The bands of adhesive tape should be replaced around the can to avoid any danger of light fog, etc.

Perforating of both negative and positive film is one that requires exacting attention, and to obtain the best possible results it is essential that the perforating machine be in perfect order and be run at a slow speed. It is advisable in every case to maintain a standard of humidity in the perforating room in order to balance the changes that take place in atmospheric conditions from day to day. Static trouble can usually be eliminated by maintaining an average humidity. Should trouble be had in this respect it can usually be overcome by using wet sponges, etc., in the room. There are several brands of stock on the market today which are not subject to static troubles. Where they are used it is not necessary to follow the above instructions.

PRINTING. All good brands of film remain practically the same as far as flexibility is concerned before, during and

A NEW HAMPSHIRE FOREST. Rudolf Eickemeyer.

after development, the only precaution necessary is to see that good contact is obtained between the positive and the negative. It is necessary that the width and thickness of the base remains the same to avoid "running up", etc. in the printing machine.

Development: The following formulæ are especially recommended and are now in use by the majority of concerns throughout the world:

These formulæ, Nos. 1 and 2, are especially desirable for over-exposed negatives and should be used in every instance where (the so-called) hard negatives are desired.

Formula No. 1 for Negative Film

Water	100 gals.
Hydrokinone	8¼ lbs.
Sulphite of soda (anhyd)	31¼ lbs.
Carbonate of potassium..............	125 lbs.
Bromide of potassium................	2½ lbs.

Formula No. 2 for Negative Film

Water	80 gals.
Hydrokinone	6½ lbs.
Sulphite of soda (anhyd.)	25 lbs.
Carbonate of potassium..............	39 lbs.
Bromide of potassium................	6½ lbs.

Formulas 3 and 4 are especially practical for normal or under-exposed negatives or when contrast is desired.

Formula No. 3 for Negative Film

Water	100 gals.
Hydrokinone	5 lbs. 13 oz.
Metol	1¼ lbs.
Sulphite of soda (anhyd.)	25 lbs.
Carbonate of soda..............	50 lbs.
Bromide of potassium...........	1¼ lbs.

Formula No. 4 for Negative Film

Water	80 gals.
Hydrokinone	4 lbs.
Metol	3 lbs.
Sodium Sulphite (anhyd.)	21 lbs.
Potassium carbonate	25 lbs.
Potassium bromide	1¼ lbs.

Formula No. 1 for Positive Film

Water	100 gals.
Hydrokinone	1 lb. 6 oz.
Metol	4 lbs. 3 oz.
Sulphite of soda (anhyd.)	21 lbs.
Carbonate of potassium	13 lbs. 14 oz.
Bromide of potassium	2 lbs.

Formula No. 2 for Positive Film

Water	80 gals.
Metol	1¼ lbs.
Hydrokinone	2¾ lbs.
Sodium sulphite (anhyd)	17 lbs.
Sodium carbonate	17 lbs.
Potassium bromide	1¼ lbs.

In compounding the above formulæ first dissolve the sulphite of soda and then the carbonate of soda in the quantities of water given and then filter. In a small part of this solution brought to the boiling point by heat add slowly the hydrokinone then the metol. After mixing this solution with the first, add the bromide stirring constantly to avoid precipitation.

The developing baths should be kept at a temperature as near 65° Fahrenheit as is possible and be maintained at a strength that will give complete development in about two and one-half minutes for positive film and five minutes for negative. The system of vertical tanks with the film wound on frames or racks is advised for handling as this system is more convenient than using a drum and not only allows rapid examination of the film, but makes it possible to stop development quickly and the bath kept in good condition for a number of days, especially if the tanks are hermetically sealed or covered when not in use.

Frames can be of wood (covered with one or two coats of celluloid varnish) or of metal.

The tank must not be porous. Therefore, those made of porcelain, or of cement or wood lined with glass or porcelain are preferable to those of other construction.

The dimensions of the frames and tanks depend upon the amount of room available and the quantity of work to be done, yet it has been found most practicable to use frames holding two hundred feet of film. After the frames are loaded they

IN THE UNDER-CROFT, WELLS CATHEDRAL. S. G. KIMBER.

should be submerged slowly in a tank of clean water, then immediately submerged in the developer, raising and lowering the frame several times to avoid air-bubbles on the film. After development (which should always consume about the same amount of time) the frames should be removed from the tank and washed for a minute or two in running water, then placed immediately into the fixing bath.

The following is an excellent formula for a fixing and clearing bath that will last for a considerable length of time and is equally practical for both positive and negative film:

Water	100 gals.
Hyposulphite of soda................	250 lbs.
Bisulphite of soda....................	62½ lbs.
Common salt	16¾ lbs.

The film should remain for at least five minutes in this bath or a few minutes after the visible disappearance of the unreduced silver. It should be borne in mind that negative film requires more time in the fixing bath than the positive.

When the fixing is complete a thorough washing should follow to eliminate all traces of hyposulphite. Several practical methods are being used for this purpose, one being to submerge vertically the frames in tanks where the water is continually flowing at not over 65° Fahrenheit. Another method is to place the frames in compartments where they are washed by spraying.

Drying should be done in a room free from dust and preferably by a current of heated air maintained at a given temperature and humidity, and should be as rapid as is practical, but care should be taken to avoid heating the room too much as it is apt to cause the celluloid base to become brittle and cause excessive shrinkage. The generally accepted standard of drying heat is 77° Fahrenheit. Drying may be hastened by using a good ventilating system and dry air.

During the summer and in countries where there is excessive heat the gelatine emulsion is made extremely soft at times, and it becomes necessary to harden the same in order to handle it to the best advantage.

HARDENING FORMULA

Water	100 gals.
Chrome alum	125 lbs.

Submerge the frame of film in this bath immediately after the rinse that follows the development and allow to remain therein for from two to five minutes. It is advisable, however, to use the hardening solution after fixing as this will do away with the excessive long washing necessary to eliminate all traces of the alum which prevents the fixing solution from doing its work thoroughly.

Motion picture film should be as nearly perfect as possible and it is, therefore, advisable to limit the number of manipulations to as few as possible and to avoid whenever possible intensifying or reducing. However, there are times when it is absolutely necessary to intensify or reduce in order to get the desired results.

BICHLORIDE OF MERCURY INTENSIFIER. Note—This solution should be marked "POISON" and the tank in which it is contained should be kept covered at times when not in use.

This formula is especially desirable for film where there are no extreme contrasts.

Solution No. 1

Water	100 gals.
Bichloride of mercury	41¾ lbs.
Bromide of potassium	25 lbs.

Submerge the frame of film in this solution and allow to remain therein until the image has become quite white. Then wash for at least one-half hour in running water, then submerge in solution No. 2:

Solution No. 2

Water	100 gals.
Liquid ammonia	41¾ lbs.

This will restore the color after which it will only be necessary to place the frame in running water for ten minutes to complete the operation.

IODIDE OF MERCURY INTENSIFIER. Note—This solution is also poisonous and should be labelled the same as the bichloride of mercury solution.

This method is more regular than bichloride of mercury and has the faculty of reducing contrasts in addition to intensifying the general image.

Water	100 gals.
Sulphite of soda (anhyd......)	83 lbs.
Iodide of mercury	8¼ lbs.

Submerge the frame of film in this solution and allow to remain therein until the desired strength has been obtained, then wash in running water for at least fifteen minutes and place in the regular developer for from three to five minutes, after which it should be washed again for thirty minutes.

REDUCTION

Formula No. 1

I advise the use of the permanganate formula for all positive and negative film of normal strength. The film if dry should be soaked in running water from ten to fifteen minutes before being placed in solution No. 1 consisting of:

Water	100 gals.
Permanganate of potassium	6¾ oz.
Sulphuric acid	2 pts. 6 fluid oz.

Attention is directed to the fact that reduction in this solution is extremely rapid. When the right degree has been obtained the film should be placed immediately in solution No. 2 composed of:

Water	100 gals.
Bisulphite of sodium	50 lbs.

which will eliminate the yellow tinting of manganese dioxide (left from the permanganate) after which the film should be washed for from fifteen to thirty minutes and then dried as usual.

Reducing Formula No. 2. This formula is advised where the film is very contrasty for it has the faculty of reducing the dense portions of the negatives without any material change in the high lights or thinner portions. Place the wet film in solution No. 1 which is made up of:

Water	100 gals.
Persulphate of ammonium	33¼ lbs.

As soon as the right density has been obtained, place the film in solution No. 2 which consists of:

Water	100 gals.
Sulphite soda	10 lbs.

H. OLIVER BODINE. J. E. MOCK.

This will stop the reduction immediately after which film should be washed for from fifteen to twenty minutes in running water and then dried as usual.

DICROIC VEIL. This defect is produced by a lengthened development, through the presence of hyposulphite in the developing bath or by an excess of developer in the fixing bath. This defect causes the white or transparent parts of the positive to become fluorescent. It is easily removed by the following method. After the final wash (after fixation) submerge the frame of film in a solution made up of:

Water	100 gals.
Bisulphite of soda	50 lbs.

when it will be found that the yellow color disappears, leaving the white or transparent parts perfectly clean.

Attention is directed to the fact that the bisulphite solution must be freshly prepared, and it is absolutely necessary to stop its action on the film as soon as the yellow has disappeared to avoid laying a deposit of insoluble white on the surface. As soon as the white disappears wash for about five minutes in running water and then dry as usual.

A majority of subjects are beautified and made more attractive when toned or dyed with aniline colors or a combination of both. After toning the black or gray color of reduced silver is substituted by deeper colors, the transparent or white parts remaining white or nearly so, while the darker portions carry the colors of the metallic salts used in the process.

In dyeing the white or transparent parts are tinted or stained only and the darker parts remain the color of the image. Where a combination of toning or dyeing is used it is possible to obtain beautiful effects in almost any variety of shades or colors and entirely suitable for any scene.

DARK RED TONER (Copper)

Water	100 gals.
Potassium ferricynide	4 lbs. 3 oz.
Sulphate of copper.............	4 lbs. 3 oz.
Citric acid	20 lbs. 13 oz.
Carbonate of potassium.........	20 lbs. 13 oz.

Dissolve the potassium ferricynide in five gals. of water. Dissolve the sulphate of copper in five gals. of water. Dissolve

THE MALAY QUARTER, CAPETOWN. ARTHUR ELLIOTT.

the citric acid and the carbonate of potassium in ninety gals. of water. Then pour the solution of sulphate of copper into the one of citric acid and carbonate of potassium and after thoroughly mixing the same add the solution of ferricynide of potassium. This toning solution will last from eight to ten days, is economical and is highly recommended. Allow film to remain in solution until desired tone is obtained, then wash for thirty minutes.

BLUE TONER—Solution A

Water	50 gals.
Nitrate of uranium..........	10½ oz.
Iron-ammonia citrate (green scales)	1 lb. 10½ oz.
Hydrochloric acid	1 pt. 3 fluid oz.

Solution B

Water	50 gals.
Ferricynide of potassium............	13½ oz.

In making up solution A dissolve the chemicals in rotation as indicated above, after which mix solution A and B, making careful note of the fact that solution A should always be added to solution B. This solution will have a reddish yellow color which after use for some few days will be almost green.

The film should be thoroughly soaked in running water before being placed in the solution, and should remain therein long enough to give a density of color about one shade darker than desired in the finished results, after which the film is washed in running water for not more than fifteen minutes. Attention is also called to the fact that it is absolutely necessary to have every trace of hyposulphite eliminated from the film when using these formulas in order to avoid uneven toning or staining.

After having obtained a blue color given by the blue toner as outlined above a beautiful violet shade can be obtained by immersing the washed film in a solution made up of thirty drops of ammonia for each quart of water. Care is necessary in this operation to remove the rack from the solution as soon as the right color is obtained for the reason that if the film remains too long in the bath, it is apt to stain. Immediately upon removing the film from the bath place it in running water and allow to remain therein for twenty minutes.

GRANDMOTHER'S GOLDEN WEDDING CAKE. A. T. PROCTOR.

GREEN TONER—Solution A

Water	50 gals.
Oxalic acid	12½ lbs.
Chloride of vanadium..........	2½ lbs.
Iron perchloride	2 lbs. 1½ oz.
Hydrochloric acid	8 pts.

Solution B

Water.........................	50 gals.
Ferricynide of potassium.......	8⅜ lbs.

Dissolve the oxalic acid in hot water. Then lower the temperature of same by means of cold water and add the chloride of vanadium, after which let the solution boil until it becomes quite clear, then dissolve the perchloride of iron and pour in the hydrochloric acid. This will give a clear yellow solution to which add ten drops of 5 per cent. solution of permanganate of potassium. Add warm water to make a total of fifty gals. of water. Then pour solution A into B and use it only when the temperature is between 50° and 65° Fahrenheit. Immerse the rack of film in the above solution and stop the operation when the desired color is reached, then wash in running water from ten to fifteen minutes.

The above toning formulas give the best results when there is not an excess of contrast in the image, or in other words, without too dense blacks in any part. It should be borne in mind that all metallic salts being more opaque than silver the original development of films for toning should be a trifle shorter than when it is intended to finish them in black and white.

SEPIA TONE BY RE-DEVELOPMENT. The first thing necessary for perfect results in this process is to see that all traces of hyposulphite are eliminated by washing thoroughly or by immersing the film in a solution of 5 per cent. nitric acid for ten minutes, after which it is rinsed or washed for a few minutes in running water. The formula given requires two solutions.

Number 1

Water	100 gals.
Bichromate of potassium..........	8 lb. 6 oz.
Hydrochloric acid	40 pts.

MYSTERY. E. I. McPhail.

Immerse the film in this solution and allow to remain therein until the image is entirely white, after which it is washed for at least fifteen minutes to eliminate all traces of bichromate. It is then transferred to solution Number 2, consisting of:

Water	100 gals.
Sodium sulphide	83½ lbs.

A short immersion in this bath will redevelop the bleached image to sepia after which the film is cleared in running water from ten to fifteen minutes and then dried in the usual manner.

DYEING OR STAINING WITH ANILINE COLORS. Very beautiful and effective results can be obtained by this simple process, but as the colors of various manufacturers vary somewhat as to manipulation, it is advisable to obtain working formula direct from the manufacturers.

COMBINATION TONING AND TINTING. Many beautiful results can be obtained by this method and it is worthy of the serious consideration of any producer desirous of obtaining distinctive results and beautiful effects.

BLUE TONING AND YELLOW TINTING. The yellow tinting makes the dark parts of the image green which were previously made blue by toning and the transparent parts assume a beautiful shade of yellow. This is a very desirable combination for open air scenes.

BLUE TONING AND ROSE TINTING. A light rose tinting color used on blue toned film gives marvelous color effects and combinations.

BLUE TONING AND BLUE TINTING. This combination gives exceptionally fine results for night scenes especially so if the tinting color is not too dark.

RED BRICK TONING AND ORANGE TINTING. Interior scenes and sunlight effects are made exceptionally beautiful and acquire wonderful brilliancy in this combination.

RED BRICK TONING AND ROSE TINTING. This combination is especially adapted to and desirable for sunrise, early morning and late afternoon effects.

Negative Defects

1st. After development the film is more intense where there was contact with the developing frame.

Cause. This is caused when a wooden frame is used which has been kept in an over-heated place and produces extremely rapid development in those parts of the film coming in contact with the frame.

Remedy. Keep the frames in a cool place and varnish them when new with celluloid varnish formula which will be found on page 172.

2nd. Lines along the margin of the film.

Cause. Lack of care in handling the film during development, etc., or using a camera which is not clean.

Remedy. Clean the camera at least once a week to avoid dust collecting in the working apparatus, especially in the shutter. When film has been completed showing these lines, they can be eliminated to a greater or less extent on the positive if a ground glass is placed in the printing machine between the negative film and the light.

3rd. Veiling or ghosts.

It is an easy matter to discover the cause of these defects from their position on the film. If they exist along one of the edges they are made by light having entered the camera or the film reel at the time it was rolled up or loaded. If they are indistinct and always of the same dimensions they can be traced to the red lamp used for the examination of the film or the development. Oftentimes a veil or ghost is seen in each little negative or exposure always of the same shape and intensity which does not alter the margins or the space dividing two consecutive negatives. This defect is usually caused by some metallic part in or on the camera which has not been covered with mat black varnish or by sun or other intense light shining directly in the camera lens.

4th. Transparent round spots.

Cause. Usually this is caused by immersing the rack of film in the development bath without lifting it up and replacing it in the developer two or three times immediately after placing it therein. The little spots are air bells adhering to the gelatine which were not separated or broken up and thereby prevented the developer from acting on those parts of the film covered by the air bells or bubbles.

Remedy. Immerge the frames of film slowly in the bath and move them up or down or shake them several times and if

MISS COY. FRANCIS J. BUTLER.

necessary turn the frames over before allowing them to rest in the developing bath for the time necessary to complete this part of the work. A short immersion in plain water before placing in developer will prevent air bells and insure even development.

5th. Yellow damp spots, usually in those parts of the film corresponding to the fold or the ends of the developing rack.

Cause. The hyposulphite has not been eliminated in the washing due to the fact that the water did not have an opportunity to do its work in those parts of the film touching the rack.

Remedy. Give a further washing.

6th. Flatness.

Cause. When a negative film has a flat appearance or lacks brilliancy it is caused by under-exposure and under-development or by over-exposure and over-development.

Remedy. Use a developer that gives contrast, or better still see that more time is given negatives at the time of making exposure.

7th. Chalkiness.

Cause. When negatives are extremely contrasty and lack halftones, in other words have no deposit of silver in or between the transparent celluloid and the black deposit, the result is that it becomes hard or chalky and is usually caused by over-exposure and under-development.

Remedy. Use the developing formula for soft negatives and give less exposure on future subjects of similar character.

Positive Defects

1st. Lack of sharpness in the center of the image.

Cause. The negative and positive films were not in perfect contact at the time of printing, caused through an error in the printing machine or because of the fact that the film was folded or by using it when brittle or hard.

Remedy. Keep the negative and positive stock in a moderately humid room. Do not fold but keep them in rolls or reels. Adjust the printing machine so that perfect contact is obtained.

2nd. Small white irregular spots.

Cause. Dust on the face of the positive film which stops the passage of the light the size of the particles of dust on the

A DANDY START. THOMAS CARLYLE.

positive after the printing, causing the developer not to act on these spots.

Remedy. Printing should be done in a dust-proof room. (Take every precaution to avoid dust.)

3rd. Surface of film is covered with small irregular black spots.

Cause. Dust or dirt has had the reverse action on the negative as explained above for the positive.

Remedy. Brush or wipe the negative very carefully as some negative stocks are electrifiable or subject to static.

4th. Toning bath colors the positive irregularly.

Cause. The hyposulphite was not entirely eliminated from the gelatine emulsion.

Remedy. Immerge the rack of film in solution containing 1% of nitric acid, rinse in water and then proceed with the toning.

5th. The toning is not clear in the white or transparent images.

Cause. The white images or transparent parts have been veiled by a deposit of metallic ferricynide.

Remedy. A brief immerging in 5% solution of hyposulphite usually eliminates this trouble.

6th. Dense parts of the image do not retain their deposit of metallic ferricynide.

Cause. The development has been too long.

Remedy. See that the developing bath is a normal one and that the action of the toning bath be a constant one.

7th. Toning bath after being in use for a considerable length of time discolors the white or transparent parts as well as the darker ones.

Cause. The toning bath is too weak or has been exhausted by continued use.

Remedy. Discard the old and make up a new solution. After thoroughly washing the film proceed to tone in the new solution.

8th. The toning makes the white or transparent parts of the image opaque or slightly fluorescent.

Cause. Toning solution is not strong enough or it has been used on film having excessive contact.

SUNLIT. ERNEST CLAYPOLE.

Remedy. Use a fresh solution and make the images less contrasty.

9th. Irregular deposits of aniline toning color.

Cause. The film was not soaked in water long enough previous to being immerged in the toning solution.

Remedy. Wash out the toning color in running water for a continued length of time and then retone.

10th. Gelatine has been dissolved in spots.

Cause. Drying room was too warm which caused a rapid drying in some parts and very slow in others.

Remedy. Lower the temperature in drying room and turn the racks upside down.

After film has been dried and taken off the frames or drying drum it will be found that it is spotted caused by drops of water separating and drying on different parts of the film. To remove this it is necessary to clean them with a liquid of some kind that will not dissolve or soften the gelatine emulsion .

Alcohol, either grain, wood or denatured can be used if carefully handled. The usual method of cleaning is to dampen a pad with this solution and go over the back of the film only (the side not containing the gelatine emulsion) by hand or with a polishing machine.

All aniline colors used for toning baths should be handled as follows:

Make a thick paste of the aniline color in cold water, then dissolve in a larger quantity of boiling water until the solution is free from cloudiness, after which it can be added to the balance of water in tank, stirring thoroughly.

CELLULOID VARNISH. In a wide mouth bottle or jug place the desired quantity of amyl acetate, sometimes termed banana oil, and add ordinary negative or positive motion picture film that has been cut up into small pieces. Cork or otherwise seal the bottle or jug and allow the same to stand in a moderately warm place. Cover the bottle or jug, and carefully shake or turn every few hours until the celluloid film has been dissolved in the solvent, after which the gelatine emulsion (which does not dissolve in the amyl acetate) should be removed from the bottle, the solution filtered and reduced or thinned to the consistency desired.

This varnish is waterproof, is not only desirable for film racks, but can be used on all other wooden or metal fixtures in the laboratory to good advantage. It also makes an excellent cement for film and can be used in other ways too numerous to mention. Discarded film answers the purpose as well as new and either exposed or unexposed film is equally practical.

When using this varnish on large surface where brush or spray is required care should be taken to work in a room with plenty of ventilation as a combination of the fumes from the varnish and the air makes an explosive mixture. The work can be done out-of-doors or in a room where the doors and windows can be open and away from an open flame, and as it dries very rapidly even when a great many frames, etc., are being varnished but a small space is required.

The use of non-inflammable or slow burning film is increasing each day. At the present time several countries in Europe have passed laws prohibiting the use of the ordinary or inflammable stock after a given date.

The use of a non-inflammable stock will absolutely prevent all dangers attendant on the use of the inflammable kinds, for not only is it practically impossible to readily burn it either in the projecting room, machine or in storage, but there are several films on the market at the present time which are non-explosive, not subject to spontaneous combustion and which burn very slowly if at all.

Summing up the matter of finishing motion picture film it will be readily seen that it does not differ to any great extent from the finishing of ordinary photographs, excepting of course that instead of single objects or images hundreds are handled. After all, it merely resolves itself down to application on the part of the worker coupled with a knowledge of the subject at hand and correct application of the few basic principles which are the foundation of photography.

BRINGING THE CATCH ASHORE. CHARLES E. WANLESS.

SOME HAND CAMERA HINTS

By JAMES THOMSON

SOME time ago a 4 x 5 hand camera that in a novice's hands had resulted in blurry images was handed to me in order that if possible I might discover where the fault lay. Placing it upon the tripod, and focussing in the customary manner, I found the fault was not in the lens as my tyro friend had imagined, but altogether in the placing of the little celluloid tablet upon which the scale of distances is established. This scale was found to be three-quarters of an inch out of the way which in a camera fitted with a lens of six inch focal length meant a good deal. One might in fact point the arrow at six feet and really be focussing for middle distance.

EDGE OF THE LAKE. James N. Doolittle.

As this camera was fresh from the hands of the maker I wondered how many in similar condition had been sent broadcast through some workman's carelessness. The cameras of the firm responsible for this one are excellently made as I myself can testify after constant use for ten years of several of their instruments. In the present instance the fault doubtless was due to some careless worker, but none the less it is important, for not one in ten into whose hands the ten dollar instrument falls knows where to look for error. When they fail to get a sharp image the lens is usually considered to be at fault.

Before beginning serious work with a hand camera verification of the distance scale should be made. As an object upon which to focus a lace curtained sun illuminated window will be found ideal. Placing the camera upon a tripod or table, the various short distances 6, 10, and 15 feet, should be measured off and one after the other verified. If the scale is found to be correct well and good, but if incorrectly placed, all that is necessary is to move it. If the scale is wholly wrong new register may be made upon the reverse side of the celluloid, or upon a piece of white card. If the camera is to be used for photography of the portraiture order it is a good plan to use a reading glass in focussing. To focus for the longer distances it will be necessary to take the camera out of doors. Measure off the twenty-five foot distances from some strongly marked object such as a picket fence and focus on that. The fifty foot distance may be estimated.

On a hand camera I have been using for years I have lately found a lack of coincidence between the ground glass screen and the sensitive film of the plate. As up to the present I had mainly employed the camera for ordinary landscape work this want of conformity between screen and plate made but small difference but lately having to photograph doorways of ancient buildings I discovered I was not getting the required sharpness of image, and a little investigation disclosed the reason why. The frame into which the focusing screen was set required to have 3/32 inch greater sinkage in order that the ground glass should come into alignment with the emulsion side of the average plate. There is excellent reason for believing this to be a common and unsuspected cause of lack of sharpness.

TWO WHITE SPOTS

By ARTHUR HAMMOND

IN selecting his subject for picture making, the photographer has to adopt methods very different in many ways from those of the painter. He must disregard color entirely as color and must try to translate color into its equivalent value in monotone. Lines and masses are what he must chiefly look for, and in the arrangement of the material there is a considerable amount of personal control possible. The selection of the view-point very materially affects the relation of the various objects to each other. This is especially noticeable in the foreground.

The class of subjects chosen must be decided by individual preference; some will be led to seek their pictures in the fields and woods or along the banks of a river, others will prefer the rocks and surf or harbor scenes of the seaside. Each worker must decide for himself the class of subjects that is specially attractive, but everyone who desires to make pictures rather than local views must bear in mind the great importance of such things as line, mass and arrangement as compared with purely topographical interest.

Of course, one does not have to make "pictures" all the time; it is often quite expedient to take snap-shots of places or people that are interesting merely as souvenirs of a pleasant vacation or outing. Many people use their cameras solely for such records. They compile an illustrated diary and the scenes and objects depicted are interesting to them and to their friends while they may or may not be interesting to outsiders.

Now, a "picture" in the sense I give to it should be interesting to artists or critics whether they are photographers or not. In judging or criticising pictures the actual subject of the picture is not the only consideration. It makes some difference, it is true, in the individual preference. A fellow worker who is interested, for instance, in portraiture or figure studies will

Figure 1.
Illustrating article "Two White Spots," by Arthur Hammond.

be likely to be more interested in a portrait or a figure study than in a landscape or a marine view, while the latter might in the same way appeal more strongly to one who is specially interested in such subjects, but a critic usually is more interested in the treatment of the subject and the manner in which it is presented than in the subject itself. Hence the importance of "treatment".

Now, by "treatment" I mean the personal control exercised by the artist in making the picture, for although the camera is considered by many to be purely mechanical in action, there is plenty of scope for personal control in the production of camera pictures. I do not mean hand work on the negative which is sometimes referred to as personal control, but I mean the control that can and should be exercised in the selection of the subject and in the selection of the point of view, the control that can be exercised by selective focussing and by the careful consideration of the lighting and atmospheric conditions.

In outdoor pictures made with the camera the composition must necessarily be selective rather than constructive and seeing that the lighting and atmospheric conditions are not in any way under the control of the pictorialist, it is almost out of the question to go out with any very definite preconceived notions as to what one intends to take. The only practical method is to seize the opportunity as it arises and make the best of conditions as they are. The earnest pictorialist will endeavor to record his impressions of a scene rather than the mere externals, the mystery of a grey day or the dazzling brightness of summer sunlight, he will endeavor to "convey a mood rather than impart local information". The picture maker must be ever on the alert, for, often, a picture can be found amidst the most unpromising material. It is not always the famous "beauty spots" that are most to be desired as a hunting ground for pictures. They can be found as often as not, close at hand, among one's every day haunts in the city or in small towns and villages. It is very often some unusual aspect of a familiar scene that makes it pictorial.

As an example of a picture evolved out of very commonplace material I may, perhaps, be permitted to refer to the illustration accompanying these notes (Figure 1). The locality

RIPPLES. Gertrude Kasebier.

here is by no means picturesque under ordinary conditions. The picture was taken in a lane in East Gloucester, Mass., leading to a paint factory. The distant wharves are not very beautiful or picturesque on a clear day, but the hazy atmosphere hides their imperfections and transforms them into a quiet and very pleasing background. There are many points in this picture that it would be interesting to refer to.

First of all, it is an example of strength and effectiveness secured mainly by simplicity, and it is the result of an opportunity seen and seized upon without any delay. The boy was there and the sail boat was on its way to the desired spot and in order to secure some connection between the boy and the boat, I tried to make the boy look at the boat and appear to be interested in it. With my eye on the focussing screen of the reflex camera, I called to him, when the boat was nearly in the right place. "See that sail-boat out there, Alfred?" "That one, do you mean?" he said, and pointed to it. That looked just right, so I pressed the shutter release and made the exposure. Alfred did not know I was taking his picture till he heard the shutter go, but that was all the better.

In this particular instance there was very little time to spare and everything had to be done quickly, but sometimes it is necessary to wait till things are arranged as you want them. I have waited as long as an hour for a sail boat to come along and occupy the right spot in a picture. Just what the "right spot" is is rather hard to say, it might vary so much in different pictures. As a general rule it is safe to say that a point about one-third of the picture space away from one side and the top or bottom of the picture is a strong point, not right in the middle and not too much on the edge. The pictorial instinct can be cultivated to some extent by studying well composed pictures by acknowledged masters of space-filling and arrangement. There can be no very definite rules because composition is so very largely a matter of personal feeling and good taste. Unless things appear to be right on the focussing screen or in the finder, it is only wasting material to make an exposure.

Successful pictures very often are "snap-shots", but they are snap-shots only in the sense that the exposure needed was very short. Snap-shots that amount to anything are usually

the result of much thought and care in selection, or the result of quickness in seeing and recording a fleeting arrangement. Mere haphazard shooting at everything on the chance of some being good does not yield a very high percentage of real pictures.

The camera worker has some advantage over the painter in that he can record a mood, or phase of nature, in a very brief time, but the camera worker has to exercise the same care in selection as does the painter if his pictures are to be considered seriously as artistic efforts. Simplicity of subject is a most important factor in picture making and in this respect the camera man is at a disadvantage. A painter can modify and, if necessary, simplify his pictures by leaving out what he does not want, but the photographer cannot do this to any very great extent and must, therefore, strive to secure simplicity in selecting his subject.

I have tramped around Cape Ann with painters and have often noticed that subjects that appealed to them were quite hopeless for me while, on the other hand, my subjects often were not such as a painter would care to deal with. Color is a very important factor in influencing a painter in his choice, but a photographer must consider the relative values rather than the actual colors and in order to approach as closely as possible to the true values as they appear to the eye it is nearly always advisable to use orthochromatic plates and a ray filter. Every serious pictorialist should be familiar with orthochromatic methods. There are times when the plain plate is more suitable than a color corrected plate, but such occasions are very rare. When it is not possible to give the increased exposure demanded by the ray filter, a plate of the anti-screen or self-screen type will be found to be very satisfactory.

The data of the picture here reproduced are as follows:—

It was taken on a 4 by 5 Central Pan Ortho plate through a Cramer plus three ray filter. Reflex camera and focal plane shutter. Exposure one twenty-fifth of a second. The negative was developed with Edinol Hydro and was subsequently reduced a little with Ferricyanide and Hypo.

QUIET MOMENTS. T. L. JAMES.

PICTORIAL SUGGESTIONS FROM THE POETS

By WILLIAM FINDLAY

WHEN I was a boy at school what I considered the most irksome task—next to arithmetic—and, withal, the most useless, was committing to memory long "screeds" of poetry. Poets were my *bete noir.* What in all the world possessed them to express their ideas in such long-winded phrases, and why could not, the beautiful ideas which the teacher tried to impress upon us were contained in the lines, be sensibly expressed in plain prose, so that he who ran might read, instead of having to cudgel his brains in an endeavour to find out their true meaning?

A friend once sent me as a Christmas gift a volume of Wordsworth's poems. I did not express what I really felt on receiving it, but fifty times rather would I have had a stirring novel dealing with the adventures of pirates or Indian braves, or of bloody encounters by flood or field.

When I left school, however, I began in a hazy way to have some appreciation of poesy. Lines that had grudgingly been committed to memory, had a happy faculty of forcing themselves to the mind when anything opposite came before the vision. I recall one day when, freed from the cares of office, I hied me to a favourite haunt by the side of a river. There these lines from Longfellow's "Prelude" to "Voices of the Night" were released from the caverns of the memory and came forth in undreamt of beauty:—

> "Pleasant it was when fields were green
>   And winds were soft and low,
> To lie amid some sylvan scene
>   Where, the long hanging boughs between,
> Shadows dark and sunlight sheen
>   Alternate come and go."

A GLORIOUS DAWN. WILLIAM FINDLAY.

And the next time the spot was visited Longfellow went as my companion, and the whole poem was gone through, with the result that not only was the natural scenery around appreciated much more, but the poem itself became an art gallery filled with exquisite pictures.

Since that day my appreciation of poetry has grown in intensity, and when photography became a hobby, insensibly perhaps, this fact helped more than any art training I ever had in cultivating the faculty of perception—the possession of which, I take it, is the sine-qua-non to success in any branch of pictorial photography. When I secured what was considered a good picture, a poetical quotation was invariably sought for as a title. This sometimes came to the mind without an effort, but at other times a note-book in which had been treasured gems met with in companionship with the poets was referred to.

The other day I read in a newspaper an interview with Mr. Alfred Drury, A.R.A., one of Britain's foremost sculptors. He was exhibiting a model of a statue which it was proposed to execute in granite and erect in "a northern city cold" to the memory of the late King Edward VII. At the base are two emblematical groups representing "Peace" and "Unity". Mr. Drury told the interviewer that he got the idea of "Unity" while reading a poem by Rudyard Kipling on the death of this monarch. The line which he has embodied in clay, but will be represented in bronze, is, "One heart and all races."

Now, this is the point which it is wished to emphasize. Could we photographers, instead of going to the poets for phrases with which to title our pictures, reverse the process, as it were. Let part of our season's work—in the studio, in the field, by the seashore, by lakeside, by mountain tarn, in the forest, or mid the city's throng, where our lot is cast, and with whatever material lies readiest to hand—be an earnest endeavour to portray by the aid of our cameras certain definite conceptions of our ideas on scenes or incidents that have passed before the admiring gaze of our inspired writers. All inspiration is not, I wot, contained within the pages of Holy Writ. It has been handed down from age to age from generation to generation.

Let a worker concentrate his attention for a season in mak-

ing an endeavour to illustrate his favourite poem, or one which is thought suitable for pictorial treatment, and in striving to realise the vision which the words bring before the mind's eye. I feel certain that it will help to improve the standard of his work, and by concentrating the mind on a certain definite course may bring forth individuality that one may little dream one possesses.

FISHING. NINA L. LEWIS. MARGARET L. BODINE.

THE PRESS PHOTOGRAPHER

By HENRY F. RAESS

FEW people outside of the profession have any idea of the large number of young men who earn a livelihood making pictures for the daily papers and the illustrated magazines. They must be young for the work requires alertness of mind and youthful vigor.

The field of employment is very limited and the ranks are only slowly recruited. One rarely sees a help or situation wanted advertisement in the papers for this class of work. The news of a vacancy, or some one out of a position, travels fast and there is little necessity for using the advertising columns either way.

The work has a peculiar fascination on account of the quick, I might almost say kaleidoscopic, changes, that take place in the variety of the press photographer's work. It is particularly well suited for the nervous temperament of the Americans who are always seeking something new. One will not die of ennui for the editor recognizes neither time of day nor day of the week, rain nor sunshine nor location. It might be just outside of the building or a thousand miles away, it is all the same to him. Apparatus and extra clothes must be ever ready, for trains and ships do not wait. The writer has travelled thousands of miles with only a pocket comb and tooth brush as extra baggage. There was neither time nor room for anything personal to take along, for the amount and weight of the paraphernalia left neither room nor strength for more.

It has been writers fortune (or misfortune) to have been placed in a situation where it was necessary to travel for six days and nights without being able to remove even collar, tie or shoes, only the hat being removed when sleeping. These are but every day happenings and arouse neither curiosity nor comment among the boys, for these things have long ceased to be novelties.

A GROUP OF PRESS PHOTOGRAPHERS AT A SPORTING EVENT

Illustrating article "The Press Photographer," by Henry F. Raess.

The remuneration is good, some two to four times that which the average young man earns, for they are specialists and this is the age of specialists, yet curiously, the specialty consists of being an all-round man capable of meeting all emergencies.

That this work is not without strange adventures and sometimes even danger goes without saying. One night while on a Roosevelt story it was necessary to sleep on a rug on the floor in the reading room in the only hotel in town covered by a table cloth, as all beds and other suitable places had occupants. And at that the proprietor charged full rates with no discount for sleeping on the floor. At another time while on a flood story we had to subsist on a half a sandwich and half a cup of coffee for thirty-two hours, and no place to sleep except to doze in the seat of an old and dark railway coach. Peace, too, has its victims and we need not visit battle fields for grewsome sights, for murders, suicides and often wholesale accidental deaths, furnish their quota to rack the nerves of those who furnish pictures for the newspaper readers. Notable instances were the fire in a certain shirt waist factory and a destructive broken dam flood in Pennsylvania. Treading one's way among the tracks at night in railway yards is another element not unmixed with danger for trains are passing and repassing at all times and one heaves a sigh of great relief when safely out of the yard.

Another close call was when making some pictures of a new seaside resort for the press agent. It was necessary to get a view from an elevation and the highest available place was a roller-coaster structure. While making some exposures just below the highest point with a reflecting camera a sudden noise caused us to look up and we saw coming towards us at great speed a car, the latter had not been anticipated as the resort was not yet open to the public, and the roller-coaster was not doing any business although it was in running order; in addition the people in charge knew that we were on the structure. A low guard rail ran along the edge of the steep incline to prevent cars, if they should leave the tracks, from falling off the structure; we instantly grasped this rail and hung from the structure and the next moment the car whizzed past. We received quite a shock and it was some time ere we recovered.

EDGE OF A BERKSHIRE FOREST. Rudolf Eickemeyer.

OX-TEAM AT THE FORD.   CARL KREBS.

WINTER. GEORGE S. SEYMOUR.

QUICK BROMIDE PRINTING

By W. H. WOMERSLEY

TO the average amateur photographer a few lines of practical experience is better than a volume of theory, so perhaps my method of Bromide Printing may be of interest.

My original negatives being all quarter plates 3¼ inch x 4¼ inch prints are made through an enlarging lantern on to bromide paper. This enables the best and most interesting part of the negative to be selected and enlarged for ordinary purposes on to half plate size paper (4¾ inch x 6½ inch) or larger if required.

Within two hours it is possible to have twenty enlargements, sepia toned, and hung up to dry from twenty different negatives.

LATE EVENING ON A MARSH IN MAINE. MARY CARNALL.

Approximately the time is

Twenty exposures including changing of negatives, bromide paper and focussing, say	30-40 minutes
Developing singly and fixing	40 "
First washing	1 "
Hypono bath	3 "
Wash 3 changes	6 "
Bleaching	5-10 "
Wash 3 changes	6 "
Sulphiding bath	5 "
Final wash 4 changes	10 "

If all prints were from one negative the time taken would be considerably less.

The developer always used is a very simple and cheap one:—

Amidol or Diamidophenol	20 grains
Sodium Sulphite (Crystals)	½ oz.
Water	20 oz.

This must be made up just before required for use.

After using this formula for nearly fifteen years I can thoroughly recommend it. It works well with most of the English Standard makes of bromide paper, and with it stains on the paper and on the user's hands are practically unknown.

Some readers may be surprised to see this developer contains no potassium bromide, and at the same time think the developer too weak. This is not the case. Good prints are easily obtained as any reader can prove for themselves by giving it a trial.

This developer with approximately correct exposure gives good prints of good colour and plenty of half tone.

Amidol, like metol and kindred developers, gives detail before density, therefore a note or two on development will not be out of place.

Expose the bromide paper as near correct as possible—slight over is better than under-exposure and for each half plate print take one fluid ounce of aforementioned amidol developer, flow over exposed paper and develop print to infinity, that is as far as it will go—which takes 2-2½ minutes at normal temperature.

With under-exposure you will have a weak print, and with over-exposure a print much too dark. Do not alter the time

"GAUNT, DRIVEN BOUGHS, IN THE SWEEP OF OPEN WOLD." EDWARD H. WESTON.

of development, but correct the exposure. The prints that are over-exposed flash up or develop very quickly and are not developed to infinity, will, when sulphide toned give those flat, muddy yellow brown results, so often seen when looking at prints made by beginners in bromide printing.

The three illustrations are prints made from the same negative, all developed together for 2½ minutes to show results of under-, correct- and over-exposure prints.

When developing do not judge the prints by the surface. Remember that amidol gives detail first, density afterwards, therefore judge your prints during development like you would

Figure A.

a plate, by transmitted light—looking through the print when held in front of the darkroom lamp which should be fitted with an orange colour screen-glass or safe-light. When the print looks too strong and plucky examined by this method it will be good, yet you will no doubt be surprised to see the print looks very grey and flat when seen by reflected light as it lies in the bottom of the dish. After fixing you will find the greyness has disappeared and a good clean plucky print the result.

Another point to bear in mind is, if you want good colour in both black and white and sepia toned bromide prints never use

Figure B.

Figure C.

Illustrating article "Quick Bromide Printing," by W. H. Womersly.

the same developer twice, but take a fresh ounce for each print.

The fixing bath I always use is

Sodium Hyposulphite .... 10 oz.
Water .... 100 oz.

After the "Hypo" is dissolved add 4 fluid drachms of glacial acetic acid which turns the bath milky. This is now a simple and reliable acid fixing bath which toughens the gelatine somewhat and prevents stains.

Leave the prints ten minutes in the fixing bath—longer will do no harm. Personally I work with batches of twenty prints and use 25 fluid ounces of fixing bath for each batch of half plate size 4¾ x 6½ inches. In the subsequent part of my method you will notice I mention—"wash in changes." The usual system is adopted of using two large dishes. Each print is taken separately from the sulphiding or whatever the bath is, and placed in one of the large dishes full of water; when all the batch is in turn over the prints "en bloc" and remove prints one at a time into the second dish full of clean water. The first dish is then emptied, washed out and refilled with water and prints dropped into this as before, one at a time, and so on till each print has been at least three minutes in each change or lot of water.

Now we come to the time saving department. When fixed the prints are all washed in one change of water and placed in a bath of

"Hypono"* .... 1 fluid ounce
Water .... 100 oz.

For three minutes move the prints about a time or two whilst in this bath.

The hypono bath kills all the hypo in the prints. This bath can be used several times. Probably other "hypo killers" will answer just as well but I can only speak for the solution I have used.

Hypono, and I expect the same will apply to other similar solutions, has a softening effect on the gelatine; therefore the prints are now more liable to blister, hence reason for recommending to wash in "changes" and not running water.

---

*Note.—Since writing this article "Hypono" is now supplied in powder form, therefore the working instructions will be those as given by the makers for the new form. My formula and particulars are those which were issued with "Hypono" in liquid form.

AT TWILIGHT. BESSIE W. THOMAS.

After the hypono bath the prints are washed in three changes of water then sorted, those to remain black and white are hung up to dry and those you wish to sepia tone are placed into the bleaching bath of

Potassium Ferricyanide	2	oz.
Dissolved in water	50	"
Then add potassium bromide	2	"
Dissolved in water	30	"

After mixing make up to 100 oz. with water.

This solution keeps well—if filtered, after use—and can be used over and over again as long as it continues to bleach.

After bleaching wash the prints in three changes and then sulphide or "brown" in

Ammonium Sulphydrate	1½	oz.
Water	20	oz.

During this process keep the prints on the move. When the prints have fully regained strength they should be washed in four or five changes of water and hung up to dry. The ammonium sulphydrate I prefer to the much recommended and used sodium sulphide.

The ammonium sulphydrate, also known as ammonium sulphide, is bought in liquid form, is cheap, keeps well and gives a better brown colour. Further the odour is not as objectionable as that given off by sodium sulphide.

Some readers are sure to wonder and say to themselves, "Are the results permanent?" All I can say is, I have used this method some five or six years and so far can find no trace of fading or deterioration in any way on any of my prints which have been made in all sizes from post cards to 16 x 20 inches, kept under all conditions, lying about loose, mounted in albums, framed and hung at home and various exhibitions, etc.

The final advice is, use the best papers of known standard makes and not rely on the many second grade lines now offered at less money.

CHRIST CHURCH, GEORGETOWN. T. L. MEAD, JR.

CARBON JOTTINGS

By A. C. BRAHAM, F.R.P.S.

SINGLE TRANSFER.—"Of course I should use carbon but I can't be bothered with double transfer" is a remark one often hears. We will ignore for the moment the implied suggestion that double transfer is more difficult than any other photographic manipulation demanding care and dexterity to ensure perfect results. It may be pointed out that there is an entirely simple way of obtaining negatives in the camera that are correct for single transfer printing.

All negatives taken on films are available for single transfer, for the celluloid is so thin that it may be printed from either side without any recognizable loss of sharpness.

When glass plates are used it is easy to secure reversal as to right and left; during exposure in the camera, by putting the glass side of the dry plate towards the lens and protecting the coated side by a thin piece of black card or stout paper, as is done by all users of Autochrome, Dufay or other colour plates.

When the plates are loaded into the dark slides in this manner it is, of course, necessary to see that the glass side of the plate is free from any smear of emulsion; should there be any, remove it with a damp cloth.

The reversal of the ground glass of the focussing screen, or a slight lengthening movement of the camera-back to the extent of the thickness of the plate will correct any error of focus.

An advantage of considerable importance in architectural work is gained by the avoidance of halation as the light, after passing through the sensitive film meets only black paper and not the reflecting surface of glass.

When developing the negative, its appearance will differ from the usual, as development will begin not on the front of the sensitive coating but from the back.

PORTRAIT OF MRS. T. A. McFarlin.

Double Transfer.—A beautiful effect particularly suitable for portraits is obtained by developing on waxed opal; the resulting print having a very effective and pleasing matt surface.

Although many, I should say most workers use opals merely waxed, a still greater measure of success, both in certainty and in the quality of the results may be secured by giving the opals after waxing, a coating of albumen containing bichromate to make it insoluble.

The following formulae answer well:—

Beat the white of an egg up in a little water to a froth, then add water to make up to twenty ozs., add one half an ounce of bichromate of potash, when dissolved, filter through muslin.

I prefer neither to raid a hen roost nor the domestic larder for my egg but to use dried egg albumen made up as follows:—

Dry egg albumen	10 grammes
Water	500 c.c.

It will be found convenient to dissolve the albumen by shaking in part of the water and then dilute. When dissolved add bichromate of potash fifteen grains. When this is dissolved filter through muslin. The waxed opal is dipped in this solution and then allowed to dry in the light so that the albumen becomes insoluble. It will be found that development is safer with this protective coating on the wax—the use of hotter water is possible and the risk of bald and washed out high lights is avoided. When waxed, the opal may safely be used ten times without rewaxing but dipping in the albumen and drying is essential each time of using.

These albumen solutions do not become offensive by keeping, the bichromate acting as an antiseptic so they may be used for a considerable time, say about three weeks before renewing.

Figure 4.

DOWNING FARM.

Illustrating article "Why is an Iso Plate?" by Horace Sykes.

WHY IS AN ISO PLATE?

By HORACE SYKES

MY photographic friend asks me, "Why is an Iso Plate"? and why take up with all of these new fangled ideas that cost money, time and patience, such as anastigmat lenses, enlarging cameras, isochromatic plates, ray filters, etc. Why not stick to the old, it is tried and true.

In the first place, what is an iso plate? It is a plate made more sensitive to the yellow and green rays of light, which when used with a proper filter for cutting off the violet, ultra-violet and blue, so greatly out of proportion in ordinary white light, will record the colors of the landscape in their proper tonal relationship, and show all gradation of light and shade much more faithfully as the eye sees them.

However, that is enough theory. The purpose of this article is to set forth in practice the advantages of the iso plate in landscape work.

Almost, if not all, landscapes contain a predominance of yellow and green rays, and a great many pleasing compositions depend on bright patches of those colors for their artistic beauty. It is needless to explain how and why the ordinary

Figure 1.
THE LONESOME PINE.

plate records those bright spots in dark monotonous tones in your finished print. You all know they do.

Then again, another composition will appeal to your artistic sense, because of an attractive formation of clouds, or a pleasing balance between cloud arrangement and foreground. Yes, you have turned away with a sigh from admiring such a scene

Figure 2.
LAKE SYKES.

because you knew full well that your plate would not record both sky and foreground in proper values. That it would either record an over-exposed sky, or an under-exposed foreground. It was beyond you to record the beauty and enchantment of that blue summer sky, with fleecy white clouds, overlooking a foreground of bright grasses and flowers, and wonderfully variegated shrubs and trees.

My kind friend the impossible has happened. The photographic artist who takes pictures for love of the beautiful, can now go forth, armed with a small convenient pocket camera, to which is fitted another of those modern miracles, the anastigmatic lens, a ray filter, and a few isochromatic plates, and return with perfect records of all those wonders of bright color contrasts, blue sky, fleecy clouds, etc.

But now for the demonstration. Turn to illustration "The Lonesome Pine" (Figure 1). Here is a beautiful subject recorded on an ordinary plate. Note the blank meaningless sky, and black monotonous representation of all the bright green tones. Contrast that with the view "Lake Sykes" (Figure 2), which was taken on an iso plate with ray filter. In the latter the yellow and green grasses of the foreground are represented by bright tones, and the wonderful variety of shades in the green trees stand out perfectly, specially the distant ones on the dark cliff.

Now turn your attention to "Saw Tooth Creek" (Figure 3), and "Downing Farm" (Figure 4). Note the bright blue of the water, and the same bright blue of the sky represented by the same tonal values. So also are the bright green grasses and the blue of the sky in "Downing Farm." The light dust of the road which is a lighter note of color to the eye than the blue of the sky, is recorded as a lighter tone in the picture. You can not help noting also the full exposure, and wealth of detail in the deepest green shadows, as well as the white fleecy clouds in proper tonal relation to the blue sky, and the general value of color value throughout. Is not the demonstration sufficient?

Figure 3.

SAW TOOTH CREEK.

Figure 1.
Illustrating article "Orthochromatizing the Negative," by T. W. Kilmer.

ORTHOCHROMATIZING THE NEGATIVE

By T. W. KILMER.

THERE is no question but that orthochromatic plates and suitable filters are the ideal means of reproducing correct color values in the negative, but, how many times are we caught somewhere without either of these necessities?

We wish to take a flower group, copy an oil painting, reproduce a dress of various bright colors, especially reds and yellows, and all we find ourselves equipped with at the time are ordinary plates. Shall we let the opportunity go forever? By all means no. For with one or two liquid colors (red and yellow) we can so "orthochromatize" our negative as to make it almost as good as though it were made on an orthochromatic plate, and with yellow filter.

The idea is an old one, and has been used by many of us

for a long time. It consists in so tinting the transparent parts of the negative as to hold back printing. Let me illustrate by referring to the two appended illustrations. They are both of water-lillies, having yellow centres. They are both taken on ordinary Seed 27 Plates using no filter. In Figure 1 you see the whole composition is spoiled by the yellow centres of the lillies coming out black in the print. By tinting these centres in the negative a deep pink, (personally I use Elmendorf's

Figure 2.

Lantern Slide Colors) note the pleasing effect produced in Figure 2. The uses of these colors are innumerable. Landscapes (taken on ordinary plates), including fields of yellow grain, beds of flowers, etc., may be so "orthochromatized" in the negative as to give excellent color rendition in the finished print.

In applying the colors, do not use them too strong. Dilute them with water and apply several washes to the same spot, each wash making the color deeper yet avoiding streaks. Use the same care as in tinting a lantern slide.

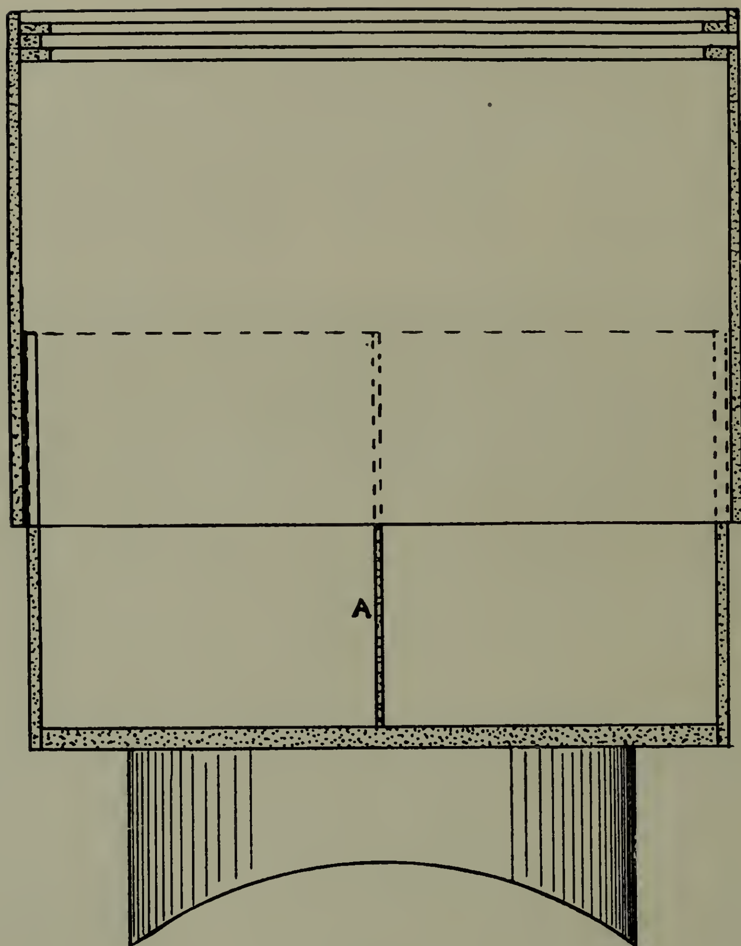


Figure 1.
Illustrating article, "A Stereoscope for Transparencies," by Henry C. Delery.

A STEREOSCOPE FOR TRANSPARENCIES

By HENRY C. DELERY

IN response to the Editor's invitation to contribute an article for *the Annual* for the Year 1915, I cannot find a better subject than to treat of a different phase of that of which I have written before: Stereoscopic Photography.

That this branch of Photography is not more popular, is due perhaps to the fact that so few amateurs have given it a proper trial, and are not acquainted with its delightful possibilities.

ST. ADALBERT CATHEDRAL. FEDORA E. D. BROWN.

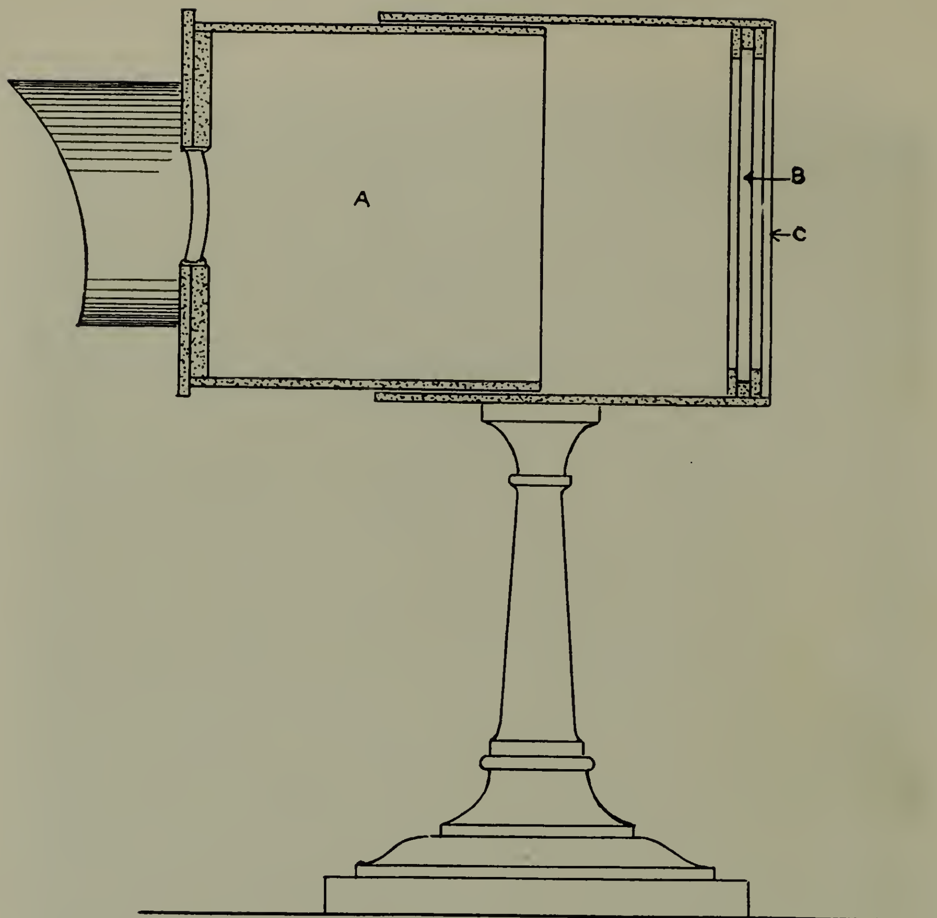


Figure 2.

With the recent progress made in our art, especially with color photography, pictures can be reproduced in the stereoscope which approach nearer the true representation of nature in all her splendor of form and color, than anything that has yet been attempted.

For those who are not so ambitious stereographs made on transparency plates or films, give results which are far superior to the old style method of printing on paper; and withal, this process lends itself to such after treatment as regards to tone and color so as to almost rival the autochrome. By this we mean the toning of the plates or films to different monotones such as red, green, sepia, etc.

The recent introduction of lantern slide films has singularly simplified this process and gives more scope to the photographer to use his ingenuity in the proper rendering of his work.

The one thing lacking to achieve a complete success, is the

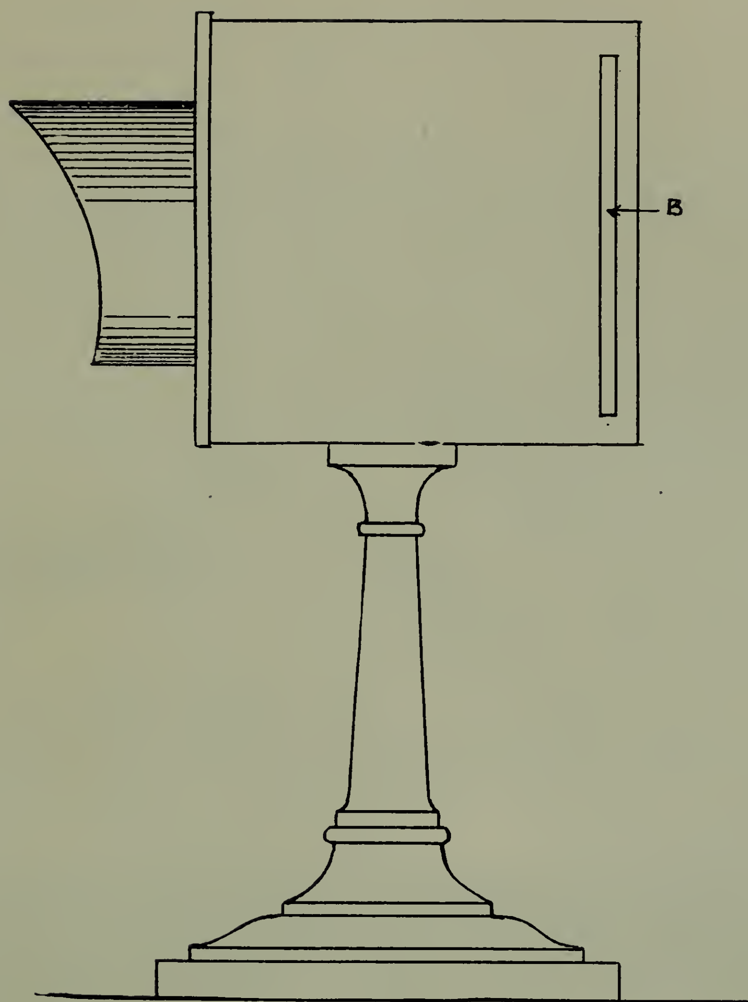


Figure 3.

negligence of the manufacturers to provide a suitable stereoscope in which to view the pictures. Conforming to the old proverb "Necessity is the mother of invention," the writer has designed the little instrument described and illustrated herewith.

The method of construction is very simple and within the reach of anyone who is slightly adept with the use of his hands. Described in its simplest terms, the stereoscope consists of two boxes telescoping each other, one end fitted with the lenses and hood, and the other with grooves to hold the slides in place, the whole being placed on a firm stand as shown in the drawings. Figure 1 shows a plan section, with the front box slightly drawn. Figure 2 is an upright section—and the last drawing is a side elevation of the instrument with the boxes closed.

Both boxes are made from stout card board, such as is employed by bookbinders for heavy books. The front part must be made slightly smaller than the rear one and so that it will fit snugly. One end is closed to which is attached the lenses. The lenses and the hood from the ordinary hand stereoscope as sold by the dealers can be used for this purpose. A partition A on plan Figure 1 is glued in centre of box, dividing the two lenses. In the rear of the outer box is made the receptacle for the slides. This consists of several layers of card board glued together so as to form a groove (B) to hold the slides. A rabbet (C) is provided to fasten a ground glass so as to diffuse the light.

All the sides of the outer box and the front are covered with thin leather. This leather can be readily purchased from a book binder. The whole is then firmly set on a stand. Care must be taken that this stand is sufficiently large at its base so that there will be no danger of upsetting the stereoscope. The bottom of this stand may be covered with plush so as not to mar the furniture.

SPINNOSISSIMA ATTAIIA. NATHAN R. GRAVES.

"Sunset skies and golden days
Are those my heart loves best."

J. T. GRIFFITH.

Figure 1.

THE JARDIN DE DANCE.

Illustrating article "Pyro Acetone Developer as a Preventive of Halation," by William H. Zerbe.

PYRO ACETONE DEVELOPER AS A PREVENTIVE OF HALATION

By WILLIAM H. ZERBE

"NOTE data says single coated plate. It does not seem possible that a single coated plate exposed against such a strong light could be so free from halation. How was it done?" The above remarks are extracted from the criticism sheets of one of the Portfolio Clubs, of which the writer is a member and who happens to be the author of the picture referred to above. This Portfolio reached me at about the same time that the invitation from the Editor for an article for the ANNUAL reached me. It occurred to me that the readers of the ANNUAL might be interested in a method to develop single coated plates, showing a minimum of halation.

Figure 2.

MR. GOUVERNEUR MORRIS.

Illustrating article "Pyro Acetone Developer as a Preventive of Halation," by William H. Zerbe.

"The Jardin de Dance" (Figure 1) accompanying this article is the photograph referred to above. It was made on a single coated (Polychrome) plate, with a Bausch & Lomb Ziess Ic Tessar lens at f4/5 six seconds exposure, developed with Pyro Acetone. I question whether a double coated plate would give better results with any of the coal tar developers, especially if carbonate of soda or potash were used as the accellerator.

Another example showing the absence of halation on a single coated plate, is shown in the portrait of Mr. Gouverneur Morris, the Author (Figure 2). This as can be seen was made directly against the light, (which by the way was the only source of light). Note the details outdoors, the texture of the draperies, and in the original print the delicate smoke of the cigarette can be seen. This had twelve seconds exposure with a Bausch & Lomb Protar at f/8. The long exposure was given to obtain some detail in the shadows. Can you imagine what would happen in the high light with such an exposure if developed in an ordinary normal developer? Even a double coated plate would not stand this test.

The two examples (Figures 1 and 2) shown here are not exceptional ones. I meet these same conditions daily, and treat all of them successfully. In fact I no longer use double coated plates. I do not pretend to say that the non-halation plates would not be better, but since my results are so satisfactory, I do not see why I should go to the extra expense of using them.

My developer is a Standard Pyro Acetone developer, but instead of using the normal strength I increase my water, decrease the Pyro and use the normal quantity of Acetone. Thus my stock solution is:

A.	Distilled water	16 oz.
	Pyrogallic Acid (Sherring's preferred)	1 oz.
	Meta Bi Sulphite of Soda.......	90 grains.
B.	Water	20 oz.
	Sulphite of Soda Anhydrous	2 oz.
	Acetone	4 oz.

THE STUDIO, SEGUIARLAND. Mary Carnell.

For a normal subject and normal exposure use

Water	10 oz.
A.	1 oz.
B.	2 oz.

Subject such as example shown

Water	10 oz.
A.	2 to 4 drams.
B.	2 oz.

As Bromide of Potassium tends to increase contrast, I rarely use it.

This modified developer is not a hurry up developer, and patience is required. The tray must be rocked during development, or the negative will show marbleized streaks. I do all my developing in a tray, but there is no reason why the modified developer could not be mixed in right proportions for time or tank.

I know of no developer capable of giving such fine gradation in any subject, as Pyro Acetone for light draperies and flower studies. In fact, any thing where fine texture is desired it is the ideal developer. Other qualities to commend it are that plates do not frill in hot weather, and it does not stain the finger any more than M. Q. does, one of the principal objections of Pyro.

I feel sure if anyone who has not used Pyro Acetone, will give it a trial, they will use it exclusively.

HORSES TAILS. NATHAN R. GRAVES.

THREE SISTER ISLANDS. JOHN E. BOULTENHOUSE.

WHITE BACKGROUNDS

By SIDNEY ALLAN

THERE are fashions in photography as in all things pertaining to the necessities and luxuries of life. The public always appreciates the novel, and the professional man has to invent at regular intervals devices to satisfy these demands.

Photography has undergone strange changes from the daguerreotype period when it took half an hour to make a picture to the autochrome color interpretation which can be taken instantaneously. Albums and the small cabinet size portraits, cherished by our parents, have long gone out of use. The size has steadily increased as has the artistic appearance of the print been improved upon. The public is no longer satisfied with a silhouetted head and bust portrait, but wants a *picture* with a liberal margin that makes it resemble an engraving.

A book could be written on the fashions in photography. And who makes these fashions? That is difficult to answer.

Figure I.

OLD STYLE. HENRY HAVILOCH PIERCE.

Illustrating article "White Backgrounds," by Sidney Allan.

The public and the wide awake practitioner go hand in hand. It is largely a matter of supply and demand, and yet as in the domain of dress and millinery, jewelry and housefurnishings it can generally be traced to a few inventive and enterprising spirits.

In portrait photography Henry Havelock Pierce has helped to set the fashion for many years. He has a large professional following. Whatever he does is adopted by scores of practitioners. He dictates to the public because he realizes what the public wants. Pierce was one of the very first who practised home portraiture. Not only that home surroundings make a more sympathetic background to a portrait, but it saves people the trouble of coming to the studio. They simply have to phone and the photographer comes to the house. Pierce predicted more than ten years ago that home portraiture would become the favorite method of portraiture, and to-day it is practised throughout the country.

It has ushered in a new style of picture making. It did away with the even top light, and introduced sunlight and shadows into the composition. The poses have become more natural and animated.

For a long time dark tones with painted-in backgrounds prevailed (Figure 1). Now there will be a decided swing in the pendulum to the other extreme. Large heads in light tones against a white background will steadily grow in demand.

There are many styles in portraiture. One photographer puts special stress on detail, another is addicted to peculiar light effects, or to decorative space arrangements. But it is the new Pierce style (Figure 2)—a middle tint against a lighter background—that is steadily gaining ground. It is something new, and more cheerful and bright.

Pierce's pictures are more than a record or a clever arrangement. They are full of vitality and win out by characteristic facial expressions. There is more dash and go, more pleasant detail, light and atmosphere to his latest style. And the public is pleased and will prefer light toned pictures—for a while at least—to the portraits of the older schools.

Figure 2.

NEW STYLE. HENRY HAVILOCH PIERCE.

Illustrating article "White Backgrounds," by Sidney Allan.

FOREST INTERIORS

By G. W. ALLYN, M. D.

NEXT to brook scenery nothing attracts the amateur's attention stronger than the woods; and nothing is more difficult to handle in its selection, composition and exposure.

The "forest primeval" (Figure 1) has ever been an inspiration to the lover, to the poet, and others who have never undertaken to select a scene, to find "the point of prime interest", to compose and make a picture worth the plate.

This should not be so difficult as the work is not hard, but simply different. Now, there is a motive not difficult to find, requiring little or no composition—a view of the trees themselves as they stand rugged and obtrusive with their shaggy exteriors draped in lichens and mosses.

The *"tout ensemble"* of such a scene is the centre of interest, the whole composition, the whole picture, which any effort to analyze would only destroy.

Another motive is a footpath, or an abandoned logway through the trees and half overgrown with grass and vines. An ideal motive is a little riverlet winding half concealed through overhanging and protecting trees—the scene which drives the trout fisherman wild.

The "forest primeval" in these days of forest destruction is a *"rara avis"*, but not entirely so to the possessor of a Series VII with a 16 inch lens. With such a lens a cluster of second growths is transformed into a forest of "great trees" the home of the "century living crow". Where these great trees were found is your own secret and need not be given away.

With a few simple laws of selection and composition a footpath offers an excellent opportunity to practice your knowledge and develop your artistic sense if you possess it. When possible secure the right and left curve—Hogarth's line of beauty—and a vistal point as an exit for the eye.

Most mistakes are made with the exposure. Under-exposure is the *bete noire* of amateurs, and, of course, here black tree

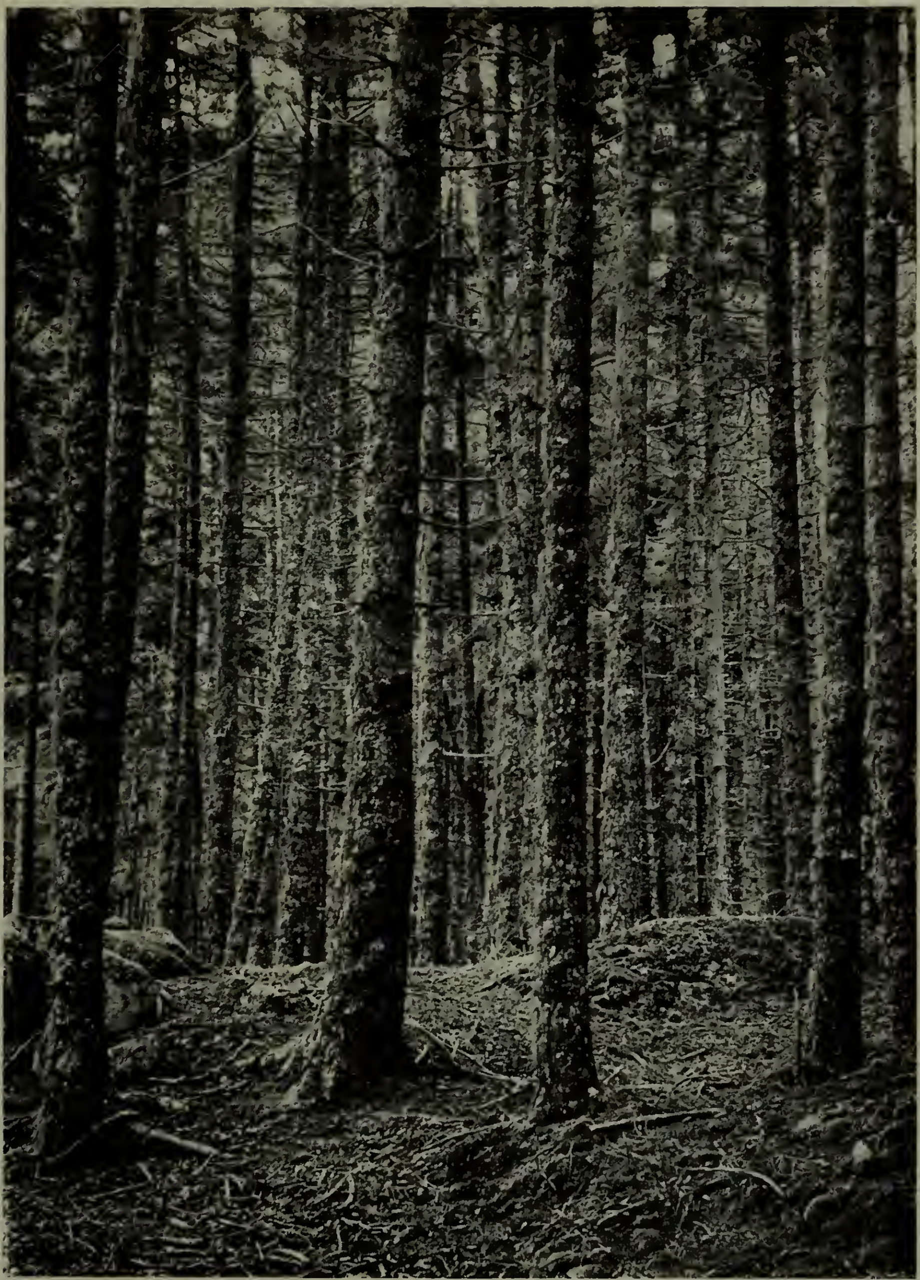


Figure I.

THE FOREST PRIMEVAL.

Illustrating article "Forest Interiors," by G. W. Allyn, M.D.

trunks soon discourage and forest photography is soon given up. Bright sunshine streaming through the branches making patchwork of the ground and tree trunks is the hope of desperation to secure detail in the shadows. Bright spots in the right places may be artistic, but you are not making crazy quilts, at least do not intend to.

As a rule the sun should not fall upon forest interiors. A day of passing clouds should be selected, and the obscuration by the clouds should be long enough for full exposure. Along the Eastern shore days of intense fog may occur with the bright sun above. These are ideal days for forest photography.

A last resort, but not a bad condition, is about sunset when the sun has left the scene, or has actually set. The glammer of deep forest at sunset is almost awe-inspiring.

Sufficient and proper exposure in these unusual conditions is absolutely a "*sine qui non*". The exposure must be right and nothing but an actinometer like Wynne's, which gives the actinic power of the light at that instant, will answer at all. The time of the day, the day of the month, and the month of the year in exposure tables, never as expeditious as an actinometer, are absolutely no good here.

"Fools may rush in where angels fear to tread" and make snapshots on such occasions. In all work which may be made artistic strive to be serious. Do not waste time and plates upon "funny" things, bumps upon logs and trees, old hornet nests, and the like. Better take your plates home.

SWEET PEAS. NATHAN R. GRAVES.

THE OLD TRAIL.

Illustrating article "Forest Interiors," by G. W. Allyn, M.D.

Exposure 1/100 second, F6.5, Anti-Screen Plate
Illustrating article "Thermo Development Simplified," by Malcolm Dean Miller, M.D.

THERMO DEVELOPMENT SIMPLIFIED

By MALCOLM DEAN MILLER, M. D.

SINCE the publication of the two-solution duratol-hydrochinon formula in the 1914 *Annual,* I have spent a great deal of time in working out its application to Thermo development, as devised by Mr. Alfred Watkins and explained by him as Method B in the 1911 edition of "The Watkins Manual."

I was forcibly led to adopt the Thermo system by several considerations, among them being the abolition of the dark-room light, with consequent freedom from light-fog, which had previously bothered me in spite of precautions with so-called "safe" ruby lights, and the superior results obtainable on all color-sensitive and double-coated plates. Exposure having been standardized within narrow limits by the use of a Bee meter. there seemed absolutely no reason to risk fogging by

PORTRAIT. BELLE JOHNSON.

tentative development, particularly as the Thermo method gave more uniform negatives from a wide range of subjects.

Perhaps the greatest convenience of the Thermo system is that development takes place at room temperature, so long as the baths do not exceed 80 or fall below 40 degrees. The first step, therefore, is to provide beforehand a supply of water in any suitable receptacle and allow it to come to the temperature of the room. This does away entirely with the wholly impracticable advice (outside of a laboratory fitted with heating and cooling apparatus) to develop for a fixed time at 65

Exposure ½ second, F16, Anti-Screen Plate.

degrees. A second great convenience is that all kinds of plates can be automatically developed to the same stage of contrast. For instance, one handles an ultra-rapid plate, a rapid orthochromatic plate, and a medium double-coated ortho plate in all respects alike with the single exception of varying the concentration of the developer; yet all three will give negatives of exactly the same printing contrast if correctly exposed. As most amateurs use two or three kinds of plates for different classes of work, they will find Thermo development a saver of time and material.

THE BLIZZARD. G. W. HARTING.

The Thermo formula I advocate is precisely the same as the two-solution published last year save that the water has been reduced from 32 to 20 ounces, in order to allow mixing the very strong solution required for VVS (very, very slow) plates.

MODIFIED THERMO D.-Q.

A.	Potassium metabisulphite....	60	grains
	Duratol	30	grains
	Hydrochinon	90	grains
	Water to make.............	20	ounces
B.	Sodium sulphite, anhydrous..1	or 1½	ounces
	Sodium carbonate, anhydrous.1½	or 2	ounces
	Water to make	20	ounces

The working speed remains unaltered with variation of the sodas, and I sometimes mix 1 and 1½ and sometimes 1½ and 2, without appreciable difference in results. The larger quantities, however, are perhaps more suitable for paper development, for which purpose the S and M dilutions are good.

DILUTION OF DEVELOPER

Plates are classified according to their development-speed from VVQ (very, very quick) to VVS (very, very slow), and each class gives a standard amount of contrast when developed in its proper dilution, as indicated by the code letters. Should this standard not be correct for the individual user's requirements, the plate is simply changed into the next higher or lower class.

Class	VVQ	VQ	Q	MQ	M	MS	S	VS	VVS
Drams	1½	2	2 2/3	3½	4½	6	8	10	12

Example: A plate listed as M requires 4½ drams of A and 4½ drams of B, with water to make the total volume 3 ounces for tray development or 10 ounces for tank development. The only variation which should ever be made is to change the classification of the plate, if the suggested development-speed gives too much or too little contrast to suit the user.

DEVELOPMENT-SPEEDS OF PLATES

ANSCO—Film, MS. BARNET—Superspeed Ortho, M; Extra Rapid Ortho, MS; Red Seal, M; Red Diamond, MS; Self-Screen Ortho, MS; CENTRAL—Special XX, S; Special Home Portrait, S; Special, M; Special Non-Halation, MS;

Exposure 3 seconds, F6.5, Anti-Screen Plate. The plate was one of a box which had been fogged by exposure to fumes of turpentine.

Comet, M; Colornon, MQ; Panortho, MQ. CRAMER—Crown, S; Anchor, MQ; Banner X, S; Instantaneous Iso, MQ; Medium Iso, MQ; Commercial Isonon, MQ; Portrait Isonon, M; Trichromatic, MQ; Spectrum, MQ; Slow Iso, MQ; Contrast, VVQ. DEFENDER—Vulcan, M; Vulcan Film, S; Ortho, MQ; Slow, VVQ. ENSIGN—Film, MS. FORBES—Challenge, VQ; Snap Shot, Q. HAMMER—Special Extra Fast, MS; Extra Fast, M; Aurora Extra Fast, MS; Ortho Extra Fast, M; Fast, MQ; Slow, VQ; Ortho Slow, VQ. ILFORD—Monarch, VS; Zenith, VS; Special Rapid, VS; Rapid Chromatic, M; Ordinary, Q. IMPERIAL—Flash Light, M;

Special Sensitive, MQ; Orthochrome S. S., MQ; Special Rapid, S; Orthochrome S. R., MS; Non-Filter, MQ. KODAK—Speed Film, S; Non-Curling Film, S; Kodoid Plates, S; Portrait Film, S. LUMIERE—Sigma, S; Blue Label, MQ; Film, S; Ortho A, M; Ortho B, MQ; Panchro C, MS; Slow, M. MARION—Record, S; P. S., MS. PAGET—XXX, M; XXXXX, MS; Swift, S; Extra Special Rapid, S; Ortho Ex. Spec. Rap., MQ; Panchro Ordinary, Q; Panchro Color, VQ; Special Rapid, S; Hydra Panchro, MQ; Hydra Rapid, MQ. PREMO—Film Pack, S; Speed, S. ROEBUCK—Blue Label, S; Ortho, M. SEED—30 Gilt Edge, MS; 27 Gilt Edge, MS; 26X, MS; 23, MQ; Color Value, M; L Ortho, MQ; C Ortho, VQ; Non-Halation, MQ; Panchromatic, VQ. STANDARD—Extra, M; Imperial Portrait, M; Orthonon, MQ; Polychrome, MQ; Thermic, MQ. STANLEY—50, M; Commercial, MQ. THORNWARD—Regular, S; Ortho, M. WELLINGTON—Extreme, S; 'Xtra Speedy, MS; Film, MS; Iso Speedy, M; Portrait Speedy, M; Anti-Screen, M; Speedy Special Rapid, M; Ortho Process, M. WRATTEN—Panchromatic, MQ; Process Panchromatic, Q.

TABLE OF TEMPERATURES

Degrees Fahrt.	Minutes Tray	Minutes Tank
80	1¾	7¾
78	2	8½
76	2¼	9½
74	2½	10¾
72	2¾	11¾
70	3	13
68	3¼	14½
66	3¾	16
64	4	18
62	4½	20
60	5	22
58	5½	24½
56	6	27
54	6½	30
52	7½	33
50	8½	37

PORTRAIT. R. & M. Dührkoop.

48	9½	41½
46	10½	46
44	11½	51½
42	12¾	57
40	14½	63

INSTRUCTIONS

Look up the development-speed of the plate and mix the developer with water which has stood in the room long enough to come to the room temperature, adopting for the first trial the strength of developer suggested under "Dilution of Developer" for that class. (If the result is not what is wanted, change the classification of the plate in future work.) In total darkness, or in a safe light, lay the plate in the tray and flow on the developer, immediately covering the tray light-tight with a larger tray, and note the time. Now turn on the white light and note the time in the "Table of Temperatures" for the particular temperature. During development the two trays, held tightly together to prevent entrance of white light, may be rocked a few times to insure even development, but constant rocking is not necessary, and, in fact, tends to "plug" the highlights. As soon as the required time has elapsed, turn out the white light, uncover the tray, rinse the plate and drop it into the fixing tank, where it should remain covered until thoroughly fixed. A luxurious refinement is the use of an "Improved Interval Timer," which can be set for the time in minutes and fractions thereof, started when the plate is covered, and rings a bell and stops running when the time is up. I strongly recommend white light only, as the change from total darkness to white light and vice versa is easier on the eyes than any ruby light; furthermore, it guarantees absolute freedom from light-fog. The solution should be used for one plate only; but it may be saved for paper development.

I have observed the working of this system in many hands besides my own and can assure readers of the *ANNUAL* that if they try it carefully and select the proper plate classification to give them the results *they* desire, they will find its advantages so obvious that they will probably adopt it for all their work.

For gaslight paper, the S dilution will be found amply strong for the slow chloride emulsions and the M dilution for the por-

trait or professional varieties. Several correspondents have called my attention to the fact that the VVS dilution will deposit crystals on standing. I confirmed their results; but I found that the trouble was most likely to occur when the barometric pressure was low and that crystallization took place only very slowly in fair weather, allowing ample time for tray development; and I have successfully developed plates in a solution containing crystals by rocking the tray occasionally. In my own work, I get strong negatives with S dilution on S plates even from Multispeed exposures of 1-2,000 (rated); though if light-conditions were so poor that serious underexposure resulted with this shutter or with a focal-plane shutter, a stronger developer might obviate the necessity of subsequent intensification. Reduction of both sodas lessens the tendency to crystallization. The minimum amounts which work well are ¾ oz. of anhydrous sulphite and 1 oz. of dry granular carbonate.

Exposure 1/5 second, F16, Anti-Screen Plate.
Illustrating article "Thermo Development Simplified," by Malcolm Dean Miller, M.D.

HOMEWARD BOUND. CHARLES W. DOUTT.

AN EXPOSITION IN THE MAKING

By JAMES N. DOOLITTLE

ONLY a month or two after this Annual has passed into the hands of its readers, this nation will have opened to the world the gates of The Panama Pacific International Exposition in celebration of the greatest achievement of man. As great an achievement as was the construction of the Panama Canal no less must be the celebration in its honor and we Californians—San Franciscans in particular—feel justly proud that the honor of entertaining visitors from the four quarters of the globe has been intrusted to us. As a Californian—and a San Franciscan in particular—that pride has caused me to watch almost, timber by timber, the transformation of a waterfront district of wharves and shipyards into a fairyland of palaces, towers and gardens.

No more fortunate choice could have been made in selecting the site. Nestling in a natural amphitheatre at the foot of San Francisco's most fashionable residence section and close under the guns of the United States Military Reservation, skirting the shores of one of the most beautiful harbors of the world, the turquoise blue of which is ever dotted with white winged pleasure craft, the Exposition City lies resplendent in masses of reds, blues, greens, and golds.

Although at present nearing completion and only suggestive of their ultimate beauty, the palaces, sculptures and gardens are monuments to the art of their designers. Already the soft neutral tint of the walls and columns, half hidden by palms and shrubbery, suggests the harmony of color that will prevail; color which is dominant without suggesting the gaudy, circus-like appearance which one is apt to associate with merely a "World's Fair."

Harmony—that word has apparently rung constantly in the ears of the artists and guided their hands in the attainment of that purpose.

Figure 1.
THE COURT OF THE FOUR SEASONS.
Illustrating article "An Exposition in the Making," by James N. Doolittle.

While the dominant style of architecture has been patterned after the Spanish Missions in California, the buildings have been modified where necessary to conform to the courts on which they face, eight of the main exhibit palaces forming a group bisected by an avenue east and west and intersected by avenues north and south, each intersection forming the three great courts.

Ultimately the central court or "Court of the Universe" will undoubtedly be the most beautiful, for already piles of discarded plaster moulds are disappearing to make place for fountains, green lawns and flowering shrubbery; already are the bold and graceful lines of classic columns peering from behind a lacey network of scaffolding to at length cast their reflections in crystal pools and lily-dotted lagoons.

Over the southern portal of the great central Court of the Universe rises the Tower of Jewels, which, second to the Horticultural Palace will be the most beautiful edifice of the group but is now only a framework of steel heavy enough to endure forever but destined to a brief existence of only ten months. This tower will be the center of a brilliant night illumination being hung with over one hundred thousand hand-cut "jewels" or prisms which will reflect and flash myriads of ever-changing tints and colors.

From the Court of the Universe one passes on the east into the Court of Abundance and on the west into the Court of the Four Seasons (Figure 1), this latter being the most beautiful of the minor courts. Surrounding a sparkling fountain, half hidden by olive trees and flowering shrubbery stand the Palaces of Education, Social Economy, Liberal Arts (containing the Photographic exhibits) and Agriculture, faced by Roman columns behind which figures representing the seasons of the year surmount cascades of crystal water.

From this court one looks from under a classic arch upon a broad lagoon on the farther shore of which stands in stately splendor the beautiful palace of Fine Arts, somewhat isolated the better to display its beauty and to prevent, perhaps, the possibility of a conflagration jeopardizing the safety of the priceless art treasures contained within its walls. The main portion of this palace is a semicircular gallery of absolutely fireproof construction built on an arc of eleven hundred feet

Figure 2.

PALACE OF HORTICULTURE.

Illustrating article "An Exposition in the Making," by James N. Doolittle.

radius. The entire roof of this gallery is of translucent panes through which the light will filter in pleasing softness upon the canvases and statuary below. At present deft hands are shaping models and forming moulds within this space for cornices, capitals and statuary which will finally ornament the exterior.

The visitor at this time is amazed at the wonderful growth of palms, trees, grass and flowers all of which have the appearance of having existed in their present state for years. The grass and flowers of course, under the influence of the warm California sun have sprung into verdant growth within a few months, but the trees and palms themselves many years old, have been taken from the wooded slopes of Niles Canyon many miles from here.

The Horticultural Palace (Figure 2) architecturally the most striking building of the eleven Palaces, rises from a semi-tropical garden like a huge bubble of iridescent glass to shelter millions of delicate blossoms gathered from the gardens of the earth.

In the soft glow of the setting sun reflecting its roseate splendor from a thousand surfaces this building seems as though snatched from a city of the Arabian Knights, and, preserved through the ages, transplanted in our prosaic midst. Covering an area of over five acres and surmounted by a dome (Figure 3) one hundred and sixty feet in height constructed entirely of glass, this palace will contain the exhibit of all phases of practical horticulture. Among other things a fully equipped fruit canning establishment will be in daily operation together with a seed and orange packing establishment, olive oil presses and the various implements and tools used in the culture of fruits, trees and flowers. The frostless California climate which enables plant life to attain its highest perfection will give the floricultural exhibit a distinction it has not been able to attain at other expositions where seasons have been short and winters severe.

I need not more than mention the great Machinery Palace, the largest building on the site and said to be the largest wooden building in the world, the four carloads of nails and the 1500 tons of bolts and washers used in its construction. At present, in the space that is not already being occupied by

Figure 3.

UNDER THE DOME OF THE HORTICULTURAL PALACE.

Illustrating article "An Exposition in the Making," by James N. Doolittle.

exhibits, mammoth figures stand awaiting assignment to their final posts, one group to crown the Column of Progress is composed of three colossal figures each twenty-five to thirty feet in height.

Festival Hall at the opposite end of the gardens from the Horticultural Palace will be of the French Theatre style of architecture and will contain the seventh largest pipe organ in the world and have a seating capacity for 3000 persons. Under the influence of an army of mechanics, this edifice is being rapidly transformed from a forest of beams and girders into a building that will rival the others in architectural beauty and splendor.

Lest I shall have escaped too far from the thought that this article is intended for fellow photographers and not simply a recitation of such facts as I have at my command, I have endeavored to show in one or two prints the beauty of a wonderful work at an incomplete stage and to suggest the magnificence of the celebration which this country has planned for the completion of the Great Panama Canal.

I had at first questioned the fitness of offering such an article to the members of our fraternity but perhaps I have become emboldened by an enthusiasm and appreciation which I have failed utterly to disseminate.

Those among the readers of this book, however, who venture westward during the coming year will, undoubtedly, camera in hand, visit this exposition and preserve in picture that which will long remain a lingering memory.

SINGING CHILDREN. HELEN W. COOKE.

QUANTITY VALUES IN PHOTOGRAPHY

By F. M. STEADMAN

IT has been said by some observant writer that the development of a child's mind and hand as shown in the first crude pictures that he draws, and in the various stages of his later development under instructions, depicts very accurately the stages of the world's progress in art through the ages.

The novice who buys a camera proceeds to snap at every object in sight, and loses fully three quarters of his films through under-exposure after spending an inconvenient amount of time and "catching cold" from exposing his photographic perspiration to too much draft (through the pocket). He usually gets careless and forgets for a season to press the button.

I am wondering whether or not this period of disgust that practically all novices have to pass through has any counterpart in the world development of photography. I hope not.

Now, let us look at one of those films that Mr. Novice has spoiled. Here on one is the faintest area of deposit, and it is seen to be from the face and dress of a little child. It was snapped in the shade rather late in the day. Such a condition may be explained as resulting from a "one inertia" exposure since the development only sufficed to "just overcome" once, as may be said, the "inertia" of the emulsion.

Now, the truth is that the "actinicity" or photographic strength of the light on the face of the child, was a simple quantity value which value is measurable in simple units, and the necessary exposure thus found with mathematical accuracy. The exposure which he gave was about 1/16th or 1/32nd of normal, and with 16 or 32 times that exposure the film would have been normally effected.

Two years ago in this Annual I gave a clear outline of my unit photography, and the present object is to show how natural it is to conceive of the photographic values as simple and calculable, and to show how the adoption of rational units

LANDSCAPE.

F. M. STEADMAN.

will raise the status of our craft to a more dignified position in the educational world.

I shall deal now with lens stops instead of the actinic unit for the measurement of surfaces with the object of disclosing the true simplicity of their nature, and to prove that the present stop numberings are wrong scientifically, and that unit numbers should be substituted for them.

Imagine a completely darkened room on the shady side of a house with a window closed with black paper slanted in a certain part to directly face the clear sky. Lend me an audience of a half dozen children to experiment with. First, in the shade of the house I let them see a strip of smooth bromide paper tinted through the star shaped opening in a note book cover (my well known method of tinting papers). One tint is made with a rather short exposure, and another darker tint with more time so that they can see clearly that the paper gets darker as the action of the light is increased.

Now, taking them into the darkened room I punch a hole with a pencil in the black paper which darkens the window. Then, a certain distance from the hole I expose the bromide paper for sixty-four seconds and show them that a tint is secured. Now to the point: I make another hole close to the first one and ask them how long it will take for both together to make the same tint with the book at the same distance. Every child would know at once that it would only take half as long even though they were too small to calculate that half of 64 seconds was 32 seconds. This is natural reasoning from cause to effect. How about that pile of wood that we used to have to carry in to the old woodbox behind the kitchen stove? How young were you when you woke up to the fact that if you could get your chum to help you could both do it in half the time, and then play marbles longer?

To apply simple units in calculating quantity values is to rope it with the lariat of reason and brand it with the plain figures 1 and 2. This means that a certain formed cone of light must be taken as 1 so that a double value may be 2, and a four time value 4, &c., just as the one hole and the two holes in the black paper in the experiment with the children, and just as the two boys can carry in the wood in half the time needed for one.

THE DECLINE OF DAY. ARTHUR J. STOCKTON.

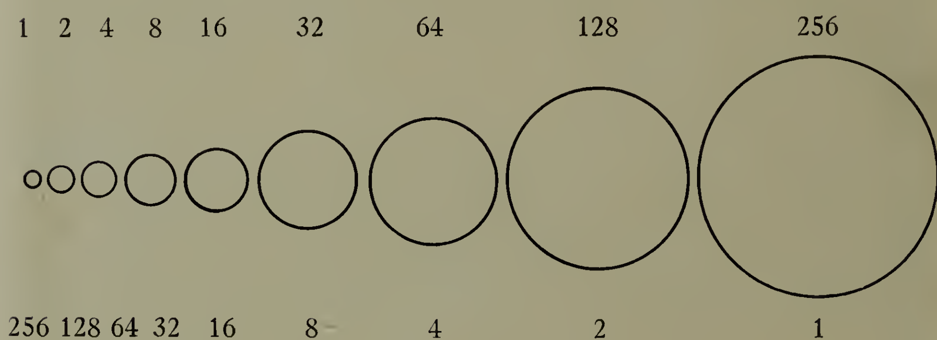
Let us suppose a job of work that takes one man 256 days to perform

Men	1	2	4	8	16	32	64	128	256
Days	256	128	64	32	16	8	4	2	1

Compare the two lines. One man requires 256 days to do the work; two men 128 days, 8 men 32 days, 64 men 4 days, and 256 men can do it in one day. It is just the simplest sort of reasoning and common sense.

Below is how the Royal Photographic Society of Great Britain fixed it to express just as simple value in the U. S. or Uniform System Stops. (To their credit I must say that they later went back on the method completely but it still clings to most of the cameras made in the United States.)

Relative solid angle and working speed of stops.



The lower line shows the relative time in seconds for each stop to make an exposure under the same condition of subject and light. Just as with the men the little stop requires 256 seconds to do the work, the next larger having twice the area can do it in 128 seconds; the one having 8 times the area can do it in 32, and the largest one having 256 times the area of the smallest can make the exposure in one second.

Now, if we call the smallest stop number one the numbers right through will be as given in the top line, and the time it would require for any stop to expose could be calculated understandingly just as the problems of men and labor. But the R. P. S. said that the numbers should be indicative of the relative time required to expose and not of the real working value of the stops. When the R. P. S. saw that this child of theirs was growing up with its toes sticking straight out behind,

PORTRAIT.

Helmar Lerski.

and its cranium bent, it is no wonder that they tried to strangle it. It is a pity that they did not succeed completely. Try to reason the same with men and labor. Who could possibly think of calling the one man 256 because he requires 256 days to do the job of work, and of calling the 256 men one because they can do it in one day. This is exactly what was done when they devised the uniform system of stops.

It is a simple statement of fact to say that not one percent of the owners of cameras with these stop numbers have a correct conception of the meaning of those numbers. If they learn at all to use the different stops intelligently it is because they have come to know that each one takes twice as long to expose as the next larger one. The numbers are used then simply to distinguish the stops from each other, for which purpose the letters a. b. c. d., &c. would serve as well. It is clear that with such a jumble as this for stop numbers the truths of photography can never be dealt with in a comprehensible manner with the simplest calculations that the character of its values warrants.

The effect of the uniform stop numberings is to cover up the simple truth. It is a gigantic net that entangles the legs of a good racer who if he were freed would make straight for the goal. But what of the "F" or focal system now recommended by the R. P. S.? The focal system is most convenient for describing the form of light cones which lens stops will pass. Compared to the uniform system it is far preferable, but basically, so far as enabling exposure to be reasoned out and calculated logically it is as wrong as the other. This is because notwithstanding the working value of stops may easily be calculated by means of the focal numbers, those numbers themselves do not stand for these values and, therefore, the simple numerical computation of exposure are impossible by their means. To illustrate I will ask and answer a question. What is the true reason that an F/8 stop in a lens will expose in one fourth the time required by an F/16 stop? There is but one correct answer, and that is that the F/8 stop exposes in one fourth the time because it has four times the working value, or solid angle. The solid angle then is the reason of the speed. Also solid angle (or cone convergence) being a simple quantity value can just as logically be expressed by the unit 1

THE GREAT KINGFISHER. ERNEST A. BRAY.

and its multiples as can any other value as for example those of extention, volume, gravitation, &c.

In my unit photography F/64 is adopted as the unit cone and stop and exposure is understood simply as the work that stops must perform. If the unit stop needs say 32 seconds to make a certain exposure the 4 unit stop will expose in ¼ of 32, or 8 seconds, etc. If the simple act of getting an exposure correct were the only thing to consider any sort of stop numbering might be tolerated, but such is not the case.

That the simple values involved in photography are not taught in the common school arithmetic and their units explained, is due to the fact that no such units have been developed by the scientists interested in this branch of physics.

As important and far reaching as photography is in the world's work, it is the one thing left unsystematized and disregarded by advanced educators. As a rule, to practice photography is to "guess" at work which may just as well be done with absolute knowledge and by reasoning from simple causes to their effects. It is to redeem photography from its own low state and to give it a foundation for study, and for a greater

FIGURE STUDY. JOSEPH MAERZ.

respect in the scientific world, that its values must be expressed in their simplest forms. Also as a matter of straight physics, stop values are simply cone forms and a cone made larger becomes a hemisphere and a sphere. In these days a great deal of attention is being given to intrinsic brightness, and in the investigation of light problems, it is necessary at times to consider light sources of even brightness and great expanse, and to calculate from the two facts of brightness and expanse the brightness that may be secured on surfaces from other illuminated ones.

In dealing with expanses like a sphere and hemisphere the dimension involved is solid angle, just the same as in lens stops, but it is evident that the F system is not broad enough to deal with such dimensions. In these problems we must deal with the simple value of "solid angle", and there must be a unit method of expressing this value that is uniform throughout from the smallest stop in a lens to the full value of a sphere.

There is a law in science that says "A unit of measurement should be of the same character as the thing measured". The inch is itself length and a measure of length; the dollar is value and a measure of value; the pound is weight and a measure of weight, &c.

Then since solid angle or ray convergence in cone form is one of the basic physical causes in effecting illumination, to measure it rationally we can only use a selected quantity of the same value as the unit. Otherwise, the scientific requirements can not be fulfilled, nor the conditions for the simple calculation of its problems be provided.

THE WAITING CAB. C. L. RUCK.

IN SEARCH OF THE PICTURESQUE

By ARTHUR PLUNKETT

WE are all familiar with the statement "truth is at the bottom of a well," and one can apply the same words to pictorial truth, for few of us are born artists with the power to see a picture at a glance.

Fortunately most men are potential artists, and the artistic faculty is very easily developed, but only by the search for pictorial truth shall we learn her secrets, and her deepest revelations are given only to those who seek with real set purpose; but there must be most method in our search. We can never find truth by stumbling blindly along the by-path. We must find the great highway which is represented by the great principles that men in all times have found to be the best means of expressing the artistic truths as revealed to them.

When we make a photographic print we must put into it a certain amount of our own personality. It must bear the stamp of our individuality, otherwise we must not consider it to be a picture. For what is a picture? Is it not a means of reaching the mind through the eye?—an attempt to express truth by pictorial means. This implies a motive in our search for the picturesque. We must have one idea and the expression of that idea must guide all our work. This must be clear to us before we can make any serious attempt to make photographic pictures.

Without motive a picture is impossible, all other ideas must be subservient to it, all lines must lead to it, all light, all shadows must blend not only with it, but into it. Nothing can be introduced into, or taken from, our picture without considering its relation to the one central and dominant purpose we have in mind. Too much stress cannot be laid upon this point; a picture without a motive is like "Hamlet" without the moody Dane.

Most of us are quite familiar with the ordinary rules of composition, with the laws of balance, contrast, variety and repetition. Of these we have a general and a sufficient knowl-

HIS FIRST TOP. MAURICE THOMPSON.

edge, and we cannot afford to despise them, but in our search for the picturesque we must not let these count for everything. These are but the alphabet of picture making, and are but the means to an end.

Composition is what language is to poetry, but the medium by which the poet expresses the message that burns within his soul; but as a poet must be master of his language, so must the picture maker be master of the laws of composition. One of our great painters has told us that "laws are never the fathers of genius but only of the men of no genius." This is true, and we need a clear grasp of the principle of pictorial composition.

In our search for pictures let us remember a few simple maxims. First, our picture is bounded by four lines, and within these lines we must have all we require, and nothing more. There must be no desire or invitation to the eye to wander outside these limits. The picture must be complete within itself. There must be nothing to detract from the principal idea, for I prefer to speak of ideas not of objects. There must be the sense of rest and completeness. From this it follows that it is desirable to get our picture composed upon the focusing screen; to try as far as possible to get our pictures before we expose our plate, and not trust to our good fortune to work up a badly composed subject.

A great help in the field is to sketch our subjects before we expose or even set up our camera. By sketching I do not mean that we should make an elaborate crayon sketch—just a rough outline of the principal features of our embryo picture is all we require. We shall then see at a glance how the picture hangs together. This is a great aid in selecting the best view point.

We want more study and thought and fewer photographs. We must learn to think in pictures. We must cultivate the faculty of visualising impressions. We can only do this by a contrast search for pictures in our everyday life. An occasional ramble with a camera in search of the picturesque will never make us into pictorial photographers. We must constantly be on the look-out, and then one day we shall awaken to the fact that the world is full of beautiful pictures, or picture ideas that require only the voice or the touch of the artist to reveal them.

WHICH TRACK. Harold Cazneaux.

All this depends upon our powers of observation in the first place, but we must learn something more, we must add to observation, the one thing without which observation is of little avail. That one thing, reflection. When we observe we must also reflect. We must turn our experience and intellect upon what we have seen. Let thought and reflection hold the reins for a time. Then when the eye and the brain have done this work, then and only then, may we give the rein to our imagination.

If only we would guide our imagination we should get a higher standard of pictorial work, and be less likely to be led away by mere eccentricities that we have mistaken for the promptings of genius.

Imagination will give us something more than a photographic record; it will give us the power to create. All things concrete, all things artistic, must first dwell in the imagination, and by this power we create. We have all a spark of imagination within us. The fact that we aspire to produce pictures is proof of this fact. Then let us develop this power—then our search for the picturesque will not be in vain.

HAWKSHEAD. ARTHUR PLUNKETT.

PENSIVE. GILL & SON.

A WORD ON HIGH-SPEED PHOTOGRAPHY

By J. ELLSWORTH GROSS

THE improvements in apparatus for high-speed photography are unique and progress is actually and scientifically measured by the improvements in plates, camera, lens and shutter.

We can not record anything more wonderful than the modern photographic plate. Its perfection seems to be reached. The higher H. & D. value they evolve from year to year does not appeal to all high-speed photographers.

NIGHT SCENE, N. H. AVE., WASHINGTON.

E. L. CRANDALL.

The modern reflex camera has reached its top round in the ladder. The ease of its manipulation has increased the range of our possibilities.

The high-speed worker must have his photograph perfectly sharp and without a blur. Most blurred high-speed work is out of focus. The shutter may have been rapid enough, and the reason for the blurring often is that the lens with a reasonable focal length has very little depth of focus.

High-speed photographers often employ a lens of short focal length because its depth of focus is worth while. This is not of importance in subjects one can focus with certainty upon a given point, but is of great importance when photographing games, such as base ball and cricket. To avoid blurring it is well to try the swing lens. It gives a chance for all parts of the plate to come simultaneously into focus, by swinging the lens horizontally or vertically.

The Multispeed shutter is a between lens shutter. It corrects the lateral distortion met with in the use of the focal plane. It gives sharpness and fullness of exposure. Its simple adjustment to any camera will put a photographer in position to do high-speed work.

The long-focus lens has many advantages, but its disadvantages are often great in the objects that come in the way, as innumerable thing that presses in for notes or snaps.

Practise brings good results in the uses of the long-focus lens. One is often obliged to use the long-focus as he may not be permitted to get near enough for any other. The newer long-focus lenses of very wide aperture are competing with the anastigmat and these lenses now seem to be the greatest boon to the advancement of high-speed photography.

This is a most fascinating study especially when the work with the lens is looked upon from the academic instead of the utilitarian view.

LOWER BROADWAY. G. W. HARTING.

THE OLD GRIST MILL.

Illustrating article "My Sketch-Book," by Bayard Breese Snowden.

MY SKETCH-BOOK

By BAYARD BREESE SNOWDEN

THIS is the story of an earthly soul, who has lapsed from grace and glories in his fall. To put it otherwise, my pictorial ambitions soar not so high as once they did. Time was when I went my way bent for a niche in the artist's corner, with shades of Claude and Corot beckoning me on. That time is gone; no longer do I climb the heights of genius, producing masterpieces of landscape composition along the way—masterpieces interesting to no one but myself.

From masterpieces I have descended to sketches. With a smaller camera and a happier heart, I wander here and there, gathering impressions of the little things that go to form the life and temper of the town and region in which I live. My album is no longer a portfolio of master efforts. It is a mere sketch-book, crammed with the gleanings of many an errant ramble. With a 1A Kodak and a Cooke lens you can go almost anywhere, and you do not hesitate to take a chance at a

THE WINTER SUN. JOHN DOVE.

"likely" composition. The big machine has its uses, but for sketch-book purposes give me a runabout with a low consumption of gas.

On rainy days the carrying-case hangs at the hip, inside my raincoat, and for focusing an umbrella gives full protection. How often, Mr. Five-by-Seven, do you surrender yourself to the pleasures of street work on a rainy day? Not often, I venture. There are limits to your enthusiasm, and this is one of them. For me, however, the rain is a call to the colors, and I sally forth as comfortable as you please. Nor is there any

HOMEWARD. BAYARD BREESE SNOWDEN.

bother. With the scale set at forty or fifty feet the short-focus lens yields a surprisingly even definition at f :6.3, and a fiftieth of a second is ordinarily not too little. Wet pavements and buildings reflect the light, and make up for a clouded sky. Rainy streets are an amateur's paradise, did you but know it—as you never will if confined to a big plate camera and tripod.

But Paradise is not all rainy days, nor is my 1A less a pleasure when the sun is beaming brightly. The nooks and corners I have poked my nose into in all weathers with this faithful little pencil would not, I fear, have seen me with canvas, paint-box, and easel. I can leave the beaten track, I can go where curiosity leads—the weight is nothing. And every ramble,

PORTRAIT.

R. & M. Dührkoop.

every stroll, shows up material for sketches, pleasant little sketches of throbbing life or crumbling ruin. Many of them—most of them, perhaps—are not much in themselves, but taken together in my bulging Sketch-Book, they make up a record of local impressions that tell the story of a town.

It may be, as I have said, a fall from grace that I have taken, but I do not honestly think it is. After all, what can most of us hope for but sketches here and there? And why seek so far afield for the Ultimate Beauty when little patches of beauty are all about us? The greatest painters are mostly those who have handled the familiar and commonplace with insight and imagination. The everyday scenes of Holland were not too homely for the brush of Franz Hals, nor, as seen by his wonderful eye, are they too homely for the art galleries of the world.

Too high an aim overshoots its mark. I have been making better pictures since I abandoned the undivided search for masterly compositions and took up the more humble task of picturing this town as I know it.

And the Sketch-Book, interesting though it is, is not wholly an end in itself. As its name implies, it is a book of pictorial suggestions. What the note-book is to the author my sketch-book is to me. The 1A is my ever-ready pencil; the plate camera and the enlarger are my brushes.

SUPPLANTED.

Illustrating article "My Sketch-Book." By Bayard Breese Snowden.

THREE COLOR PHOTOGRAPHY FOR AMATEURS

By A. L. GAREIS

COLOR Photography, the desideratum of every enthusiastic amateur photographer, is almost as old as photography itself. The reason why this beautiful art is not indulged in to a larger extent is the complicated method of the original process, known by the name of "three" and "four" color photography.

The invention of the Lumière "Autochrome"—and Dufay "Dioptichrome" plate, although not exactly a solution of the simpler method called "direct" color photography, has made photography in natural colors accessible to all amateurs owning a plate camera. The principle of the "direct" method is nothing but a modification of the old "Joly" screen process, which has been simplified by using one screen only, whereas the old way was to use a separate screen for "taking" and another for "viewing." This method has been revived again by the Paget works in London. All the direct methods known at the present time have their limitations, viz: (1) it is not possible to obtain a colored picture on an opaque surface. (2) The colors are not absolutely "true." (3) The grain of the screens is perceptible and very annoyingly so in small pictures. (4) It is quite troublesome to duplicate the original pictures (except with the Paget plates, which however require different screens and very special plates holders so as to hold screen and orthochromatic plate in contact all over the surface).

The great advantage of the direct method is hence the surprising simplicity of manipulation,—especially in handling and developing of Dufay plates—by which the most beautiful color transparencies are obtained.

If pictures which are not limited to transparent surfaces are required, one is still forced to draw upon the old three color or "indirect" methods which have been greatly simplified and are hardly open to further improvements of importance.

A GLIMPSE OF MARTIN PLACE. B. SCHLEICHER.

The basic principle of the "indirect" method is the fact that all colors can be divided into the components "blue," "red," and "yellow," and, on the other hand, all colors can be obtained by combining the above three colors in one. It is evident that the quality of the color mixture obtained will depend upon the spectroscopic purity of its components. By placing a red filter between lens and sensitive surface of a panchromatic plate, all rays, with the only exception of the blue rays will produce a picture. If the picture thus obtained is printed in blue color we obtain the "blue" picture. In the same way we obtain the "red" and "yellow" picture if we use a green and blue filter respectively. It will be well to mention that the blue picture not only represents all colors of a true blue color, but also all those containing blue in mixture with others at their relative "blue value." The same applies to the red and yellow picture. By printing the three pictures in succession upon an opaque, gelatine coated surface (paper, leather, etc.), taking care that the superimposition is as perfect as possible, the picture in brilliant natural colors is obtained. It is not possible to reproduce a true black with ordinary means.

The following methods are the best for the ordinary amateur:

(1) Additive method (Chromoscope).

(2) Subtractive method.

- (A) Pinatype.
- (B) Modified "gum print."
- (C) "Powder" method by Prof. Miethe.
- (D) Gelatine foil method of the N. P. G.
- (E) Sanger Shepherd method (similar to Pinatype).

The taking of the three negatives is sensibly the same for all the above methods, the only difference being the amount of "softness" or "definition" required. To obtain the negatives in a safe and simple manner, it is best to use one of the special cameras made by the best European camera makers, or to have a so-called "three-color quick changing back" adapted to one's plate camera (which should have a front extension in preference to the rear movement). Most of the instruments mentioned above provide for three exposures in quick succession, and owing to the relatively simple construction they are by far the best for the amateur.

SAN FRANCISCO. ROY HARRISON DANFORTH.

A few makers have attempted to construct cameras of the "one exposure" type, the principle of which is shown by sketch Figure 1. The complicated construction and, last but not least, the fact that their use for ordinary photography is almost excluded makes them less desirable for the amateur than the instruments of the former type. (One exposure cameras are made by Sanger Shepherd in London, Lechner and Goldmann in Vienna, Bermpohl in Berlin, etc.) The best and most serviceable instruments of the three exposure class are furnished by Bermpohl in Berlin, Lechner and Goldmann in Vienna, Adams in London and Sanger Shepherd. A complete outfit, without lens from Bermpohl costs about $75 to $100. A three color attachment for a plate camera in triple quarter size about $35 to $60. As to the lenses it should be remembered that an apochromatic anastigmat will be the very best, but the amateur will almost invariably be able to use his own ANASTIGMAT for the color work.

The best lenses are: The Suter Anastigmat F:5, made in Switzerland. The Goerz Celor, the Voigtlaender Portrait Anastigmat and the Zeiss Apochromat Tessar and Planar. The shutter should be one working without vibration and in front of the lens. The best shutter, used almost to the exclusion of all others by the color workers, is that made by Goergen in Munich, known by the name of "Central" or "Silent" shutter. (See Figures 2, 2B, 2C: Suter triple extension camera. Bermpohl pneumatic automatic back. Suter Anastigmat F:5, 6″ focus, Goergen shutter, Corona Home Portrait stand.) Special praise must be given to the makers of the stand which is the ideal tripod for three color photography, as it obviates the use of a base plate.

The complete outfit for three color negatives is shown in Figures 2, 2B, 2C. An ordinary triple extension camera is used. The quick changing back is attached by sliding it into the slots where the dark slide is ordinarily placed. This back consists of a solid extension piece with grooves on both sides. A movable sliding piece capable of up and down movement and containing the three filter plates, which must be of the same size as the single negative is going to be, is held in position by the metal fittings running in the above mentioned grooves. This sliding piece takes the double plate holders. It can be

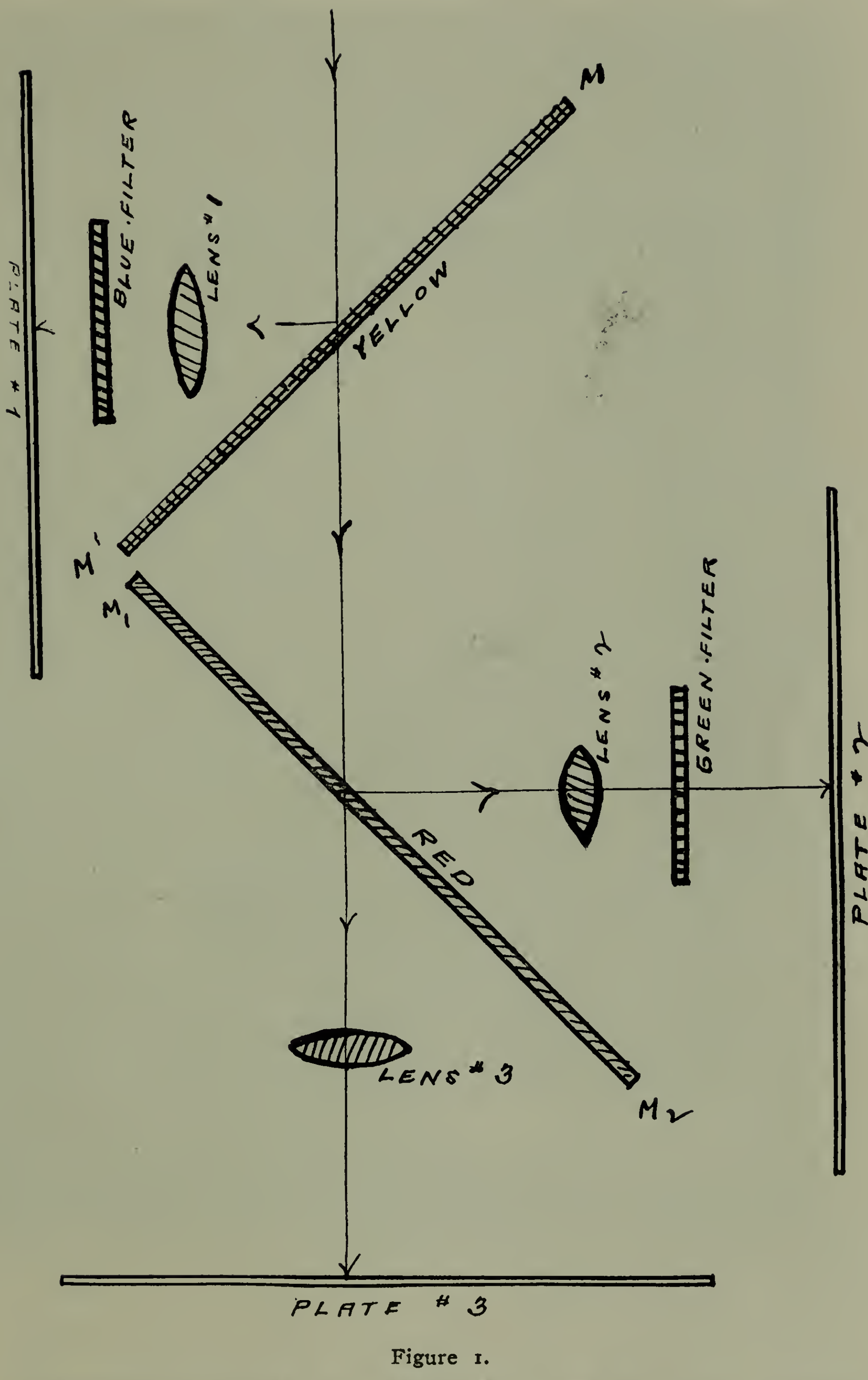


Figure 1.
Illustrating article "Three Color Photography for Amateurs," by A. L. Garcis.

either pushed up and down by hand, by a quick changing rack and pinion, or by pneumatic release (see Figure 2). If a picture is to be taken, the sliding piece is pushed upwards as far as it will go, where it will catch, the dark slide is inserted, roller shutter withdrawn, and first exposure given. A pressure on the bulb causes the sliding piece with filters and plate-holder to drop until second filter and center portion of the

Figure 2.

triple plate is in position, when the catch will stop the slide. Exposure is given and bulb pressed thus causing the third and last part of plate and filter to be ready for exposure.

From the above it will be seen that a triple plate is necessary for this instrument. The triple plates can be either "triple quarter" 4¼ x 9¾, 12 x 30 cm etc. and in most instances the taking of the three negatives upon one large plate will be found

ELEANOR.

MARIE E. JENKINS ALLEN.

more convenient, as the development is thus greatly simplified and, what is very important, can be carried out with absolute uniformity. The only drawback of the triple plate is the fact that they are not obtainable in the United States. If ordinary plates are to be used, the Attachment made by Lechner in Vienna should be used. It consists in a cubic box containing a

Figure 2b.

revolving pyramid, the three sides of which carry the plate holders and filters. By inserting the plate holders a clockwork is wound up and by simply pressing the button of a wire release the filters and plates are brought in position and lens shutter released.*

After testing the relative exposures of the three filters by

* See "Eders Annual," 1912; "Wiener Mitteilungen," 1912. Bollettino Dalla Soc. Fotografica Italiana.

FLORENTINE PINES. CESARE L. LUZZATTI.

photographing a subject of white color (small bust placed against a white or neutral gray background) and changing exposures until the three negatives are absolutely uniform, the relation thus obtained is noted once and for all. One is then able to proceed to take the first color negatives. Any brand of Orthochromatic plates can be used, or an ordinary dry plate

Figure 2c.

can be made "color-sensitive" by immersion in the following solution:

Distilled water	100 ccm
Alcohol absol.	50 "
Pinachrome solution, 1:1000	1 "

The plates are left about four minutes in the solution and dried in a perfectly dark, dry, and cool place. The above will be sufficient for about three or four triple quarter plates, or ten single plates.

The relative exposures will be found to be about 1:1.5:2.5 for blue, green and red with the Bermpohl filters. An open landscape in bright sunlight (May to September) Stop F:9 will require an exposure of about one-half second for the blue filter. It is advisable to choose landscapes, or fruit and flower

A STORMY DAY. WILLIAM H. ZERBE.

subjects first, and leave portraiture until enough experience is acquired.

Any good and rapid acting developer can be used. The plates which should be inserted into and withdrawn from the dark slide in absolute darkness (or in deep red light) are now placed in the developer and developed until a clear picture with plenty of detail is obtained. Since the plates lose their color sensitiveness after about three minutes immersion, progress of development can be examined by the normal darkroom light. After development the plates are fixed in an acid fixing bath and left to dry.

(A) The Chromoscope.

After drying, a diapositive is made, the triple transparency cut into three components and placed into the chromoscope. The chromoscope is an instrument for viewing only. The respective positive transparency is placed behind a red, green and blue glass. Each picture is reflected by mirrors into one eyepiece, thus yielding a picture in brilliant natural colors. This method is the simplest, but does not yield lasting color pictures. If such are desired one can obtain same as follows.

PINATYPE:

The Pinatype Colors, as manufactured by the "Farbwerke Hoechst & Co.," with offices at 122 Hudson St., New York, have the peculiar quality that they will readily be absorbed by soft Gelatine, while the hardened "bichromatic" or "bichromated" gelatine will not absorb any color at all or very little according to the degree of hardening. This shows, that a positive transparency is required which will serve as the original for the printing process; or in other words, as the stencil for the print plate. The diapositives should be rich in detail but not "hard." The diapositives are left to dry and the "print" plates prepared. Any old dry plate will do by simply placing it into a solution of ordinary (not acid) Hypo, thus eliminating the silver emulsion. The firm mentioned above furnishes the plain gelatine coated plates and the paper of similar nature referred to later. The gelatine coated plates (which will be called "print" plates hereafter) are sensitized in a solution of bichromate of Ammonium (2½%) by about three minutes immersion in a darkened room. It will be well

IN WINTER'S GRASP. W. A. WARD.

not to prepare any more print plates than are actually needed as their lasting quality is only about a week or 8 days. After drying the sensitized print plates in a vertical position, in a dark and cool place, the diapositive obtained by printing the "red filter negative" is placed in an ordinary printing frame, face to face with the first print plate, and exposed to strong sun or arc-light. The exposure time for the plate which will be dyed red and blue is about the same and equal to the printing time for ordinary collodion paper (about scale number 14 on a Vogel scale print meter) whilst the yellow print plate will require about three times longer.

After printing is completed, the print plates are taken out of the frame and fixed in plain water, until all the excess bichromate is washed out. This can be seen by placing the plates upon a piece of white paper. There should be no yellow drops, but merely colorless water dripping from it. Now, the red filter print plate (plate obtained from diapositive printed from red filter negative) is placed in a solution of Pinatype blue and left there about ten minutes. After the time mentioned the plate will have absorbed the color and a blue picture in all its details will appear. This plate is washed for about one minute and placed in a tray of clean water together with the gelatine coated paper. The latter should be immersed long enough to stretch completely before bringing it into contact with the print plate. The paper is now squeegeed onto the blue plate by a straight edge with rubber edge (rollers are not recommended) care being taken that the contact be perfect all over, and left for about ten minutes.

When the time is up the paper is withdrawn from the plate and the blue picture will appear on the former. (The blue plate can be immersed again into the blue dye and the process repeated as often as desired, until the detail begins to blur, which will happen after about three or four dozen pictures). The above process is repeated for the red and yellow picture, by immersing the green and blue filter print plate into the red and yellow Pinatype dye. The print plate dyed red is placed into a tray of clean water and together with it the blue paper picture obtained as described. They are squeegeed together and brought into exact register by holding against a strong light. This procedure should take as little time as possible so

PORTRAIT. Helmar Lerski.

as to avoid double contours. It will be well to prepare "register-marks" for the beginning until experience is acquired. A piece of card board of the approximate thickness of plate is attached to the diapositive by rubber plaster on the four edges. The same is done with each of the print plates.

After dyeing the latter they are brought into register with the diapositive by looking against a strong light, and, when perfect register is obtained, thumb tacks are pierced through the four pieces of cardboard so that the holes will show on both series of cardboard pieces. The tacks are left in the diapositive cardboard pieces and the print plate taken off. The second print plate is now taken, brought to register as above and the cardboard pierced by the tacks. The process is repeated with the third print plate. The gelatine coated paper, which is supposed to bear the colored picture is cut large enough to take the thumb tacks pierced through the first print plate holes and after the blue picture is obtained, the red is brought into register easily by piercing the tacks into the holes of the cardboard pieces. The same applies to the yellow plate. It must be remembered, however, that the print plates must be left to dry before bringing them into contact with the diapositive as the gelatine surface of the latter would readily absorb the color of the moist plate and the two plates would "stick together for good." The thumb tacks should be applied to the paper after the latter has stretched in clean water, so that this part of the scheme can be attended to during the process of the blue printing). In most cases it will however be quite easy to obtain a sufficiently good register without the tiresome "register marks." After the yellow plate has been withdrawn, the picture will be completed, and the result will amply compensate the amateur for all his troubles. As can be seen from the above description of procedure, the printing can be performed in bright sunlight and repeated over and over again, so that the actual printing process is rendered very simple and easy and can be mastered by anyone. The principal difficulty is the correct timing and developing of the negatives and the obtention of the clear and sharp diapositives.

(B) MODIFIED GUM PRINT.

The modified gum print is a process simpler than the Pinatype but requiring more ability, and, let us say, more artistic

inclination than the former. Briefly the process is as follows: The blue picture is obtained by the well known "blue printing method" as used by all draughtsmen. It is not necessary to make diapositives if pictures of the same size as originals are required. If larger pictures are wanted, a diapositive has to be made which is enlarged to the desired size in an enlarging apparatus, thus yielding the enlarged negative. The negatives are brought into register one by one and in the same manner as described for Pinatype, "register marks" are secured, but the thumb tacks are left in the holes of the cardboard pieces on negatives and fixed there. After the blue print is obtained the paper is coated with the "gum print emulsion" or yellow coating (Chrom. yellow) the yellow negative brought into contact and registered by the thumb tacks the whole exposed to light and printed, developed by spraying with clean water and left to dry. The red print is done in the same way as the yellow, only that a red pigment is used. It is printed under the "red" negative. The principal difficulty of this process is the ability required in applying the color coatings. (Full details of this beautiful process will be cheerfully given upon request.)

As will be seen from the above instructions, three color photography is not difficult by any means. A little experience is required, it is true, but the results obtained will repay the troubles gone through a hundredfold. It is needless to say that the color process is not intended for those amateurs who consider photography a "sport" of the "push the button, the developing man will do the rest" type. Color photography is for the enthusiast, the amateur who has artistic and scientific inclinations, who commands a superior intelligence than those who are too lazy to "fool" away their time with science and art. If my article will induce some of the photographers of the "noble" kind to take up color photography, my object will be achieved and I shall be glad to give any further instructions as to the various other processes not mentioned in the above lines.

WAYSIDE INN. G. P. KIMBERLY.

THE MAKING OF AUTOCHROMES

By DAVID J. SHEEHAN

HOW many a camera owner, who having looked on the ground glass and being charmed with the coloring presented to the eye, is certain of producing a good picture, but only suffers disappointment when the black and white print is produced. Gone is the fascination of the scene and for the first time he wakes up to the fact that it was the coloring and not the composition that made such a pleasing picture, for colors in nature, like charity, cover a multitude of sins.

Thanks to the autochrome and the other processes of screen plate photography, it is now possible to retain the natural colors, with all their vivid brilliancy. And the process of manipulating the plate is so easy and simple that one wonders why there are so few worshipers at the shrine of this goddess. Anyone who can develop a plate can make an autochrome just as successfully as the most advanced worker, if he will only follow the printed directions most carefully and explicitly.

I would like to point out here that cleanliness and care in every part of the manipulation are essential to success. It is advisable to avoid experimenting with developers until one is thoroughly familiar with autochromes. For my part I have tried several methods of developing such as Dianol, Rodinol, Pyro, etc., and have eventually come back to the starting point, viz., Metoquinone as being the most satisfactory.

My methods of procedure are as follows:—

Accurate exposure. Desensitizing the plate before development. Methodical development. Reversal and second development and when necessary (which is nearly always the case excepting making lantern slides) intensification.

Before focussing, be sure and have the color screen in position and when the image is sharp, on the ground glass, rack the lens back the thickness of the plate or if you wish reverse the ground glass before focussing.

SUNSHINE. G. L. GILES.

Correct exposure seems to be the stumbling block of most beginners, but by judiciously using a meter it becomes a very simple matter. I would not recommend the judging of exposure by the brightness of the image on the ground glass as there is very little latitude in autochrome plates, their speed is one hundred times slower than a Seed 30. I use a Watkins meter, and half the tint time as explained in Dr. Malcolm Dean Miller's article in Photo Era for January, 1912 (I would recommend every reader to study Dr. Miller's instructions in regards to the use of an actinometer) excepting in the following case:

Indoors and in conservatories and green houses, full tint time. Before developing, desensitize the plates by immersing for two minutes in the following bath, in total darkness:

Water	25 oz.
Potassium bromide	110 grs.
Sodium bisulphite	¼ oz.

When the plates are desensitized they can be developed by a deep ruby light or more preferable still by a vivida light composed of two thicknesses of green and three thicknesses of yellow vivida paper.

The process of development, reversal of image and second development are fully explained in the slip which is enclosed in the box of plates, and consequently do not need to be treated in this article. The only thing which I would like to add is that instead of bringing out the plate into full daylight for reversal and second development, I use a hundred watt Tungsten bulb and get the same effect as if full daylight was used by placing the plate about a foot away from the light.

As I have stated before, the negatives mostly always require intensification and in my hands the mercurial Iodide intensifier works as good as any. Burke & James intensine is a very convenient and easily prepared intensifier and can always be relied upon to give results. Judge intensification by looking through the plate and when the colors are bright enough, return the plate to the original developer for a few minutes and then wash for a few minutes and dry in the usual way.

If an autochrome is intensified too far it can easily be reduced by the Permanganate and Sulphuric Acid reducer.

If these few hints are of use to anyone it will be sufficient excuse for the writing of this article.

SOUS-BOIS. GINO BELOTTI.

ENLARGEMENTS OF DISTINCTION

By DAVID IRELAND

PERHAPS I may most profitably employ the space at my disposal by giving some hints on the production of enlargements of distinctive quality, and in the first place it may be stated as an axiom that no enlargement—whether portrait or landscape—will be entirely satisfactory if produced by mere straightforward projection from negative to bromide paper.

It is necessary to soften the hardness of line by a diffuser of some sort or other, and I have found the employment of black chiffon to give the happiest of results. This is placed in front of the lens after focussing, and for convenience in use it is advisable to mount the chiffon between two pieces of cardboard from which the centre has been cut out. It can be attached to one of the cards by a little paste, drawn flat, and the other card placed on top and fixed down. Three of these should be preferred carrying respectively one, two and three thicknesses of the black chiffon. The fabric should be of as fine texture as possible, and the exposure will be increased as follows:

One ply	Half more
Two plies	Double
Three plies	One and a half times

Individual taste will determine the degree of diffusion to be introduced, and the reader is advised to make a set of enlargements from the same negative, first a straightforward print, then three through the various diffusers.

Some very strong landscape subjects will stand as many as six thicknesses of chiffon which will give a dreamy etching-like effect.

The enlargement being fixed and washed, it remains if the highest degree of quality is wanted—to redevelop. For this process a solution of 240 grains Potass Permanganate—20 oz.

WOODLAND AND STREAM. John Wallace Gillies.

water is prepared. Half a dram of this and half a dram of Hydrochloric Acid are added to 10 oz. water and the print immersed, the dish being rocked until the image has entirely disappeared. Should the action hang fire, another half dram of the Permanganate solution is mixed with 2 oz. water and added in small quantities until all places of the image have vanished. The print is now washed five minutes in running water and redeveloped in daylight. Any developer may be used provided it contains no Potas Bromide. The print is then washed and dried, further fixation being unnecessary.

This permanganate and hydrochloric acid bleacher will be found to give beautiful sepia tones if followed by the application of sodium or ammonium sulphide.

CENTRAL PARK. A. L. GAREIS

PHOTOGRAPHIC MOUNTS

By L. M. A. ROY

ALL will agree that many fine prints are spoiled by inharmonious mounts, and what is the cause of this? There are many causes;—1. The inability of photographers to obtain suitable mounts in small towns and cities. 2. The disregard of many photographers for harmony in prints and mounts. 3. The ignorance of many photographers as to this harmony. 4. The failure of paper manufacturers to make suitable mounts as to color, texture and weight, and there are probably some other causes, but I think these are the chief ones.

I know that many Pictoralists who live in small towns have great difficulty in obtaining proper mounting papers for their prints. Heretofore, they have had to be satisfied with cover papers that they could secure at their printers. These cover papers as a rule, were not suitable as to weight, color, or texture, but they were much better than the embossed atrocities called amateur and professional that are sold by the photographic dealers.

But now I am glad to say many paper manufacturers are making special light weight mounting papers, which can be cut to the desired size. Samples of these can be obtained by writing to any of the better class of paper manufacturers.

Many photographers, and especially among the class called professionals, seem to have a general disregard for harmony in mounting their prints. They place brown or sepia prints on black or gray or green mounts and black and white prints on brown, or green mounts without any regard for harmony, and the only way I can explain this is, that they have large quantities of certain mounts on hand and must get rid of them at any cost.

They also use all sorts of embossed and highly colored mounts, (so called Art Mounts) marines on rippled paper to suggest waves, landscapes on grass, clover leaves, etc., and the only cause that can be given for this is ignorance.

THE PICTURE WRITER.

L. M. A. ROY.

It is about time that photographers in general gave more attention to mounting their prints.

The mount manufacturers seem never to have designed mounts for the pictorialists, and perhaps the reason is that there were so few of them, but now, that there has been such an increase of interest in pictorial photography within the last few years, it would seem that the paper manufacturers would cooperate with the pictorialists and produce some proper papers for their needs.

I will give a few suggestions to the beginner, that he may profit by some of my experiences, and improve his prints with more harmonious mounts.

The purpose of the mount is to separate the print from surrounding objects, and also to serve as a support, and at the same time not be so conspicuous as to take the attention from the print. We find many highly embossed and decorative mounts, (so called art mounts) with gold trade-marks, that take the observer's attention away from the print, and of course these should never be used under any circumstances.

The first step in photographic mounting is to trim the print. This should be done until the composition is the best obtainable. Do not hesitate to trim the print, as the mount should be made to fit the print and not the print, the mount.

Many prints are improved a hundred per-cent by a little judicial trimming.

Next a proper paper should be selected, as to color, texture and weight. Now, the character of the print must be taken into consideration, and also the effect desired.

Soft, delicate prints will look best mounted on delicate toned papers and bold, contrasty prints may be mounted on more contrasty papers. The color should be of some tint found in the print, or some neutral tint, and the texture should be somewhat the same as that of the print. Prints on rough papers should be mounted on rough mounts, and prints on smooth papers should be mounted on smooth mounts. Likewise linen finish prints will look best on linen mounts.

The best way to select a mount is to lay the print on different sheets until the best effect is obtained. If an underlay, making a small margin around the print is desired, it should be, of some tint in harmony with both print and mount and of light weight.

PORTRAIT.

B. F. FALK.

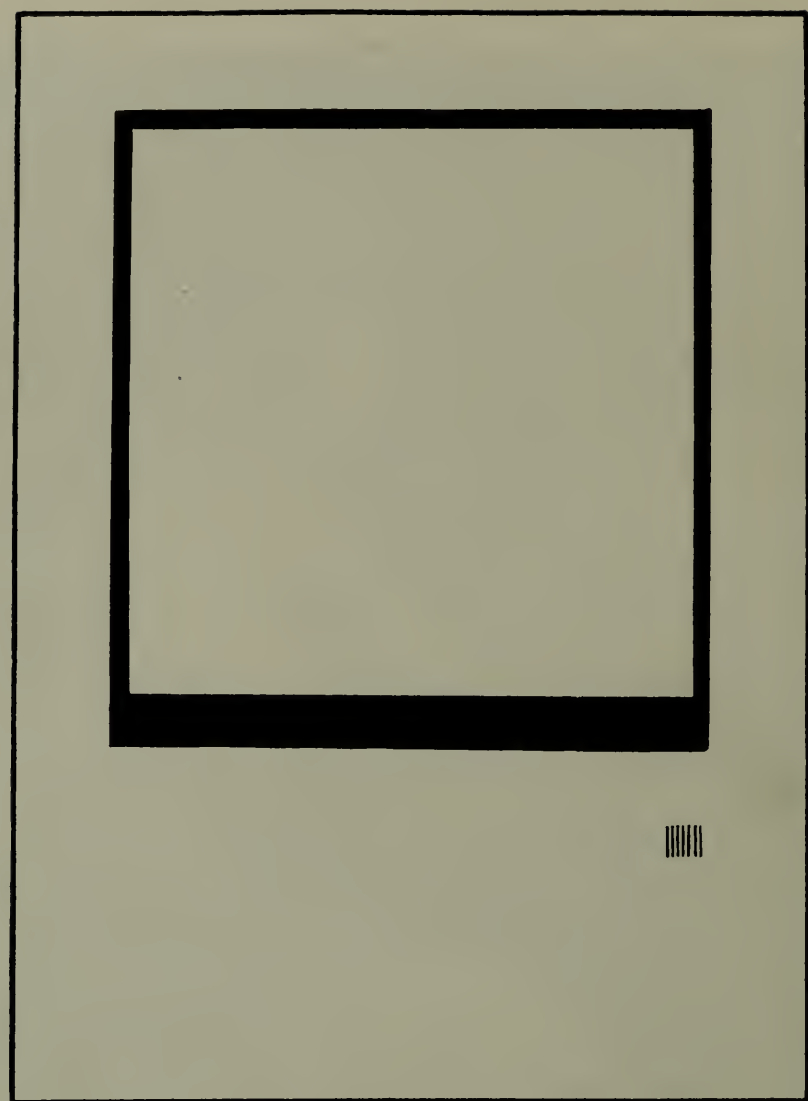


Figure 1.

The margin of the underlay should be the same at top and sides and wider at the bottom.

There are three general classes of prints to be mounted; square (Figure 1), rectangular, wider than they are high (Figure 2), and long panels (Figure 3).

The margins at the top should be the same width, but the bottom margin should always be wider; about two and one half to three times is generally suitable for average prints. This can best be told after a little practice, as a quite wide margin at the bottom sometimes gives a very good effect.

AT BREAK OF DAY. WILLIAM LUDLUM, JR.

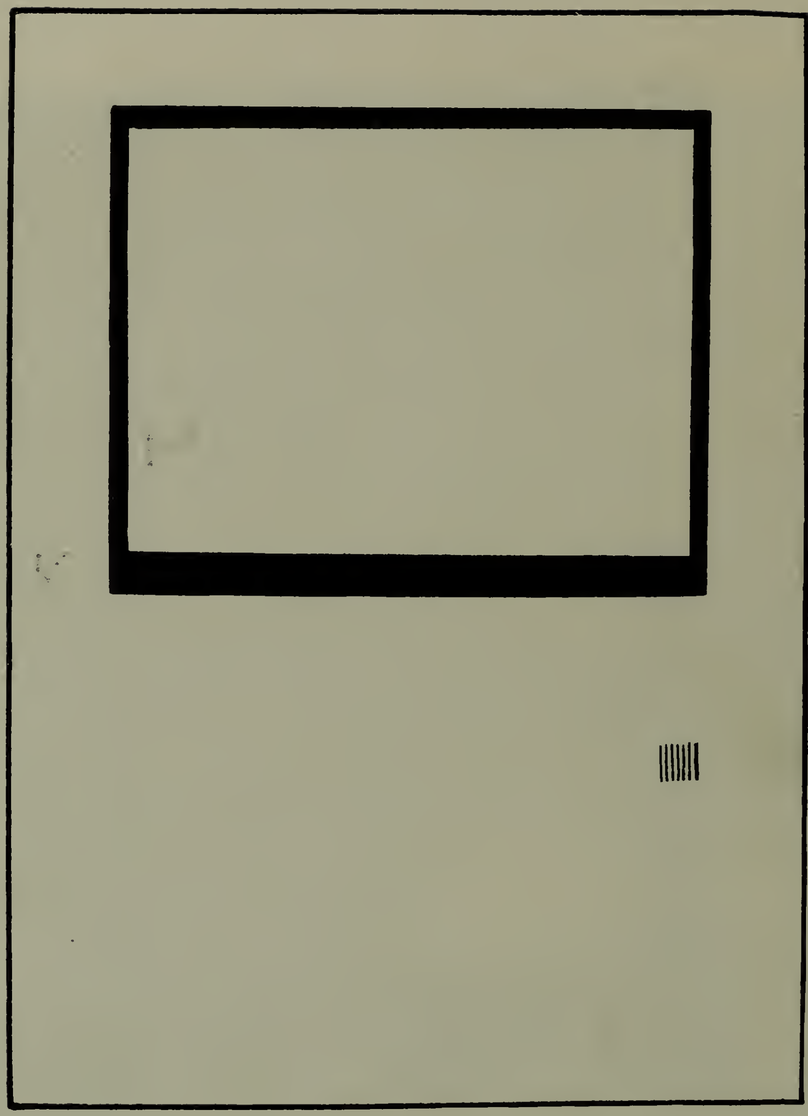


Figure 2.

As to the proper size of a mount, this must be left to the individuality of the photographer and depends on the purpose of the print and its character. However, small prints should never be used with very large mounts as they will appear lost.

The number of underlays to be used depends on the taste of the photographer, but as a rule one or two will be enough.

It is understood, of course, that the prints and underlays are pasted only at the top, and hang down perfectly flat.

If monograms or trade-marks are used, they should never be placed on the prints, but on the mounts and below, and be

EDGE OF THE WOOD. S. H. Willard.

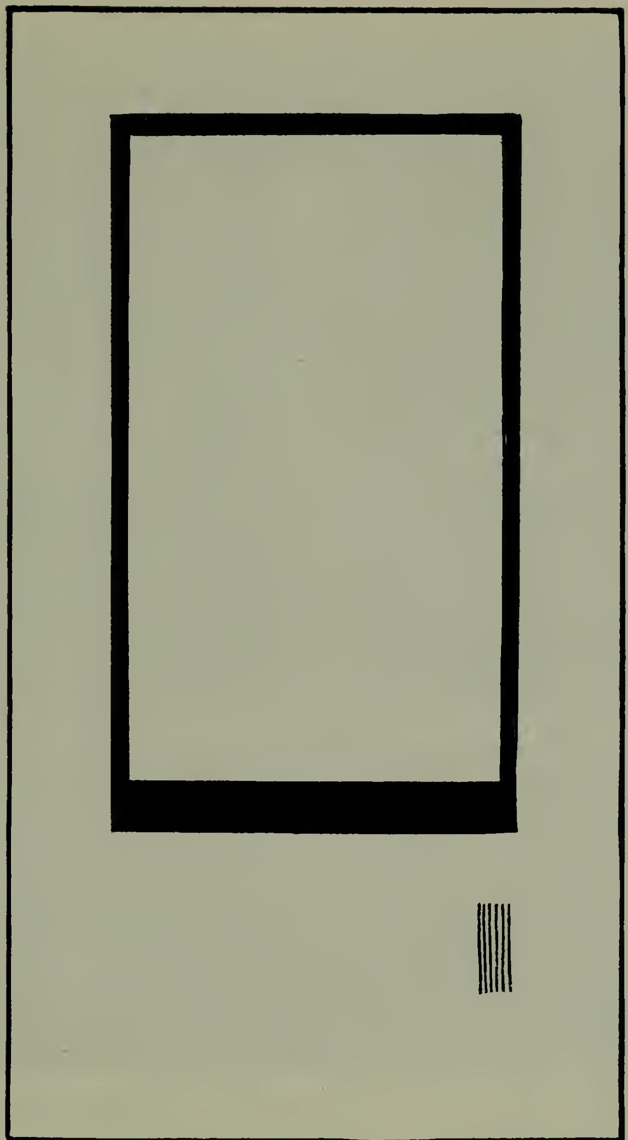


Figure 3.

of a color in harmony with both print and mount. Also they must never be conspicuous enough to draw and hold ones attention from the print.

Beware of all highly colored papers, such as bright blue, yellow, red, etc., as they can very seldom be used for mounting photographs.

After a little study and practice of this subject, the photographer will find that his prints give better effects, and the public will also notice this difference and will comment upon it.

Figure 1.
Illustrating article "Stereoscopic Photography," by H. W. Hales.

STEREOSCOPIC PHOTOGRAPHY

By H. W. HALES

THERE is probably nothing in the whole range of photographic work that gives the same pleasure as a well made stereo picture rightly mounted and viewed, and it seems strange that comparatively so few people go into, or make a success of this class of work.

It is true that more care is required than with ordinary work, but once the principles are mastered and thoroughly understood, there is a fascination about it that appeals at once to every picture lover.

There is an idea prevalent with some people that no art is required in this class of work, and that merely technically good work is all that is necessary. Such people, however, are far from being right, or understanding the subject, and the decline in stereoscopic photography is in my estimation largely due to the carelessness and stupidity of such people.

TWO WEEKS OLD. CLARENCE E. BISBEE.

There is no earthly reason why the same care should not be taken with the composition, lighting and manipulating that the finest photographic work demands, and when our workers realize this, stereoscopic photography will soon come into its own again.

With this article I regret not having the time to get out some particularly fine subjects for illustration instead of using those I had on hand (Figures 1 and 2), but there are some points that I wish to call to the special attention of the worker in this line. First, try and have the composition of the subject the best possible under all circumstances. A so called vista with a rather prominent foreground (in landscape work) and also partial side-lighting, is especially desirable. Confine your-

self as much as possible to comparatively nearby objects unless your camera lenses can be separated over 3¼ inches, and be sure to give exposure enough to get detail in the shadows. Remember also that the further the objects are away the less stereoscopic effect you get, and on that account far distant views are much less satisfactory than those comparatively near.

What is called a strong foreground is really necessary in the best stereoscopic landscapes, and if this is lacking the picture will never be as satisfactory as it would otherwise be.

In developing the negatives always work for detail in the shadows, and in printing see that this is brought out, but not buried. The ideal stereoscopic picture is a positive on glass, but excellent results can be had with the glossy printing or developing paper, and there is no reason why excellent work cannot be done on postal cards—they being not only very easy to manipulate, but very satisfactory and inexpensive.

Figure 2.

Illustrating article "Stereoscopic Photography," by H. W. Hales.

WENZEL KOPTA, VIOLINIST LOUIS FLECKENSTEIN.

THE MORNING BACKGROUND

By A. W. H. WESTON

CAREFUL study of the work of our masters past and present—and let me note there are masters in our art today whose work we can look up to and learn from, the same as we can from the past masters of the brush, appreciating the fact that they work with the same medium and face the difficulties that confront every user of the lens and plate.

Careful study then of all that is good and our own consideration of pictorial requirements apart from anything we may see in the work of others, lead us to appreciate those subtle points of difference which distinguish true art from the mediocre.

One of the points which we appreciate the more as we learn is the significance of the background and the care with which the background has been treated in those old masters, and in the good work of more modern times. One has only to apply the knowledge to one's own work to find how difficult and yet how absorbingly interesting it is to attempt those same efforts. To work with natural objects and not with painted scenery, and yet so to select and manipulate the background as to secure the relief and balance of the main object, this is art.

In dealing thus with the mass and form of object we grow to learn how all important is the lighting of the background, how glaring and brittle things become softened in a different light, and appear merely as a framework on which is hung an acceptable scheme of light and shade.

Mostly we require a background soft and delicate, or at least one in which the detail is subdued. We must avoid the glare of a full light and seek the shadows, a low sun, a gentle atmosphere. To me the morning light holds all this charm which no other time of the day can equal. The morning mist not yet dispelled, but casting a faint shroud round trees and distant objects, the sun so low and soft that hardness seems

Illustrating article "The Morning Background," by A. W. H. Weston.

impossible in anything it touches. We can face almost against the light and still get roundness—the diffusion is so good—while the background recedes in soft shadows.

We may go later in the day but we scarcely know the place, the outlines are hard, and full of that spotty detail we have learned to shun. We must go early—very early—when the sun has risen only just a little and nature is clothed in that witchery of early morning light and atmosphere.

EARLY AUGUST MORNING. WILLIAM T. KNOX.

American Annual Formulary

In the following section we have gathered together a typical collection of Formulæ and Tables, which will assist the photographer in his every-day work. It will be noticed that makers' formulæ are omitted. These can best be obtained by direct application to the makers. The appended formulæ are selected from the working methods of practical photographers.—Editor.

TANK DEVELOPERS FOR NEGATIVES

Adurol (*Montgomery*). Water, 20 ounces; sulphite soda (anhydrous), 220 grains; carbonate of soda (anhydrous), 220 grains; adurol, 45 grains. For use take 1 ounce of above to 4 ounces water; add 2 drops 10 per cent. bromide solution; temperature, 65 degrees; time, 25 minutes.

Glycin (*Montgomery*). Water (hot), 8 ounces; sulphite of soda (anhydrous), 50 grains; carbonate of soda (anhydrous), 240 grains; glycin, 45 grains. For use take 3 ounces of above and 37 ounces water; temperature, 65 degrees; time, 25 minutes.

Metol-Hydro (*Frew*). Water, 12 ounces; metol, 7½ grains; sulphite of soda (anhydrous), 274 grains; hydroquinone, 30 grains; carbonate of soda (anhydrous), 150 grains; bromide of potassium, 2 grains. For use to each ounce of above add 4 ounces of water; temperature, 65 degrees; time, 12 minutes.

Ortol (*Smith*). Water, 60 ounces; metabisulphite of potassium, 15 grains; sulphite of soda (anhydrous), 100 grains; carbonate of soda (anhydrous), 100 grains; ortol, 30 grains; temperature, 65 degrees; time, 20 minutes.

Rodinal (*Agfa*). Water, 60 ounces; rodinal, 1 ounce; temperature, 65 degrees; time, 25 minutes.

TRAY DEVELOPERS FOR PLATES AND PAPERS

Adurol—For Plates. No. 1.—Water, 10 ounces; sodium sulphite, 1¾ ounces; adurol, 85 grains.

No. 2.—Water, 10 ounces; potassium carbonate, 1¼ grains. For average outdoor exposures use equal quantities Nos. 1 and 2; for fully timed exposures take 1 ounce each of No. 1, No. 2 and water.

Amidol. A concentrated developer for plates.—Water, 13 ounces; sodium sulphite (crystals), 2½ ounces; when dissolved add amidol, ¼ ounce. The solution keeps fairly well in bottles completely full and well corked. For use take 1 ounce of the concentrated solution and dilute with 3 or 4 ounces of water.

Amidol. For gaslight papers.—An excellent developer for those subject to metol poisoning. (V. Serin.) Amidol, 60 grains; sodium sulphite crystals, 650 grains; potassium bromide, 10 grains; water, 20 ounces. Will keep only three or four days. Time of development about ½ minute.

Duratol-Hydroquinone—Universal Developer (*M. D. Miller*).—Hot water, 16 to 32 ounces; duratol, 15 grains. Dissolve and add, previously well mixed in the dry state, sodium sulphite, anhydrous, 440 grains; sodium carbonate, anhydrous, 660 grains. When dissolved, add

hydroquinone, 60 grains. Add water to make 40 ounces. Use undiluted for contrasty gaslight papers. Dilute with an equal part of water for soft gaslight and bromide papers, plates, and films. For tank development of 65° Fahr. Dilute 1 to 1 and develop 12 to 15 minutes. Dilute 1 to 2 and develop 16 to 22 minutes. Dilute 1 to 3 and develop 26 to 34 minutes. Developer without bromide gives blue-black tones; small quantities of bromide give pure black; larger amounts, warm blacks.

Edinol-Hydro—For Panchromatic Plates.—Water, 30 ounces, edinol, 120 grains; hydroquinone, 120 grains; sodium sulphite (dry), 768 grains; carbonate potassium, 1344 grains; 10 per cent. bromide potassium solution, 1 dram; 10 per cent. oxalic acid solution, 1 dram. For tank use 1 ounce of above to 15 ounces water; temperature, 65 degrees; time, 15 minutes. For tray use 1 ounce above to 4 ounces water.

Edinol-Hydro Developer—For Plates and Papers (W. S. Davis).—Water, 8 ounces; edinol, 10 grains; hydrochinon, 15 grains; sodium sulphite (dry), 100 grains; sodium carbonate (dry), 150 grains. May be used full strength for gaslight paper, also for plates and bromide paper if desired. (Normal time of development at 60-65 degrees Fahr. Two minutes for plates.) Time of development is increased in proportion to amount of water added.

Eikonogen.—An excellent developer for under-exposed portrait negatives. (B. H. Allbee.) Eikonogen, 125 grains; sulphite of soda (dry), 125 grains; carbonate of soda (dry), 125 grains; bromide of potassium, 2 grains; water, 10 ounces. For softer effects add up to an equal volume of water. The image appears quickly and builds up fast.

Glycin-Metol—For Plates (M. D. Miller).—Water, 20 ounces; metol, 60 grains; sodium sulphite, anhydrous, 240 grains; sodium carbonate, anhydrous, 440 grains; glycin, 120 grains. Dilute with an equal volume of water. Wash plate thoroughly before fixing to prevent indelible yellow stain.

Hydrochinon.—For over-exposure plates to obtain contrasty negatives (B. H. Allbee). No. 1, water, 8 ounces; sodium sulphite (dry), ½ ounce; hydrochinon, 80 grains. No. 2, water, 8 ounces; sodium carbonate (dry), 1 ounce; potassium bromide, 40 grains. Take equal parts of No. 1 and No. 2. Temperature, 70 degrees.

Metol (H. W. Hales).—Metol, 60 grains; warm water, 16 ounces; sulphite soda crystals, 1 ounce; carbonate soda crystals, 1 ounce. Dissolve metol in warm water, then add the sulphite and carbonate in order named. Cool. Can be used repeatedly. For developing papers add a few drops of 10% solution of bromide of potassium.

Metol-Hydroquinone for Orthochromatic Plates.—Water, 20 ounces; metol, 14 grains; potassium metabisulphite, 18 grains; hydroquinone, 56 grains; sodium sulphite, 1 ounce; sodium carbonate, 1¾ ounces. Use 1 drop of a 10 per cent. potassium bromide solution to each ounce only if necessary.

Metol-Hydro-Eiko—For Double-coated Ortho Plates (H. S. Hood).—Water, 15 ounces; metol, 24 grains; hydroquinone, 24 grains; eikonogen, 24 grains; sodium sulphite (dry), ½ grain; sodium carbonate (dry), 320 grains; potassium bromide (10 per cent. solution), 4 drops.

Metol-Hydro-Eikonogen—For Plates (Hood).—Water, 150 ounces; metol, ½ ounce; hydroquinone, ½ ounce; sodium sulphite (dry), 5½ ounces; sodium carbonate (dry), 6 ounces. This can be kept in a hard rubber tank for five days before exhausted by oxidation.

Pyro—For Overtimed Plates (J. D. Elliott).—Sulphite soda, 40° solution, 4 ounces; water, 4 ounces; pyro, 10 grains. Immerse plates in this solution for 20 minutes in the dark; then add to above solution ½ drachm carbonate soda, 20° solution. When image appears add one more drachm of the carbonate soda solution.

Pyro—For Plates (*J. D. Elliott*).—Sulphite soda, 40° solution, 4 ounces; carbonate soda, 20° solution, 4 ounces; pyro, 10 grains.

Pyro-Metol—For Plates (*H. M. Long*).

A—Water, 22½ ounces; metabisulphite, 2 drams; metol, 60 grains; pyro, 1 ounce. B—Water, 16 ounces; sulphite of soda, 2 ounces. C—Water, 16 ounces; carbonate of soda, 1 ounce. Normally used 1 ounce of each stock to 16 of water.

Pyro Soda—For Plates (*Mellen*). No. 1.—Water, 20 ounces; sodium sulphite (crystals), 4 ounces; carbonate of soda, 2 ounces. Dissolve the sulphite first and then add the carbonate.

No. 2.—Water, 6 ounces; pyro, 1 ounce. For correct exposures take 1 dram of No. 2; 1 ounce of No. 1, and add 2 ounces of water. For snapshots, or plates thought to be under-exposed, use 1 dram of No. 2; 1½ drams of No. 1, and 6 ounces of water. For over-exposure take 2 drams of No. 2, 1 ounce of No. 1 and 6 ounces of water. Or, instead of the 2 drams of No. 2 in this solution use 1 dram of No. 2 and 10 drops of a 10 per cent. solution of potassium bromide.

Pyro-Metol-Acetone—For Plates (*Cramer*). No. 1.—Water, 60 ounces; metol, 1 ounce; citric acid, 40 grains; pyro, 1 ounce; sodium sulphite (dry), 6 ounces.

No. 2.—Water, 48 ounces; liquid acetone, 12 ounces. For plates take 1 ounce No. 1, 1 ounce No. 2, water 5 ounces. For tank take 1 ounce No. 1, 1 ounce No. 2; water, 13 ounces.

DEVELOPERS FOR LANTERN SLIDES

Hydroquinone (*B. H. Allbee*).—No. 1.—Hydroquinone, 150 grains; metabisulphite potash, 10 grains; bromide potassium, 50 grains; water, 20 ounces.

No. 2.—Sulphite soda (dry), 1 ounce; caustic soda, 100 grains; water, 20 ounces. Take equal parts of No. 1 and No. 2.

Hydroquinone—For Colder Tones (*B. H. Allbee*). No. 1.—Hydroquinone, 60 grains; sulphite soda (dry), 1 ounce; citric acid, 10 grains; bromide potassium, 10 grains; water, 10 ounces.

No. 2.—Carbonate soda (dry), 1 ounce; water, 10 ounces. Use equal parts.

FIXING BATHS AND HARDENERS

Acid Fixing Bath (*Carbutt*).—Sulphuric acid, 1 dram; sodium hyposulphite, 16 ounces; sodium sulphite, 2 ounces; chrome alum, 1 ounce; warm water, 64 ounces. To prepare the bath, dissolve the hypo in 48 ounces of water; the sodium sulphite in 6 ounces; mix the sulphuric acid with 2 ounces of the water and pour slowly into the sulphite solution, and then add to the hypo solution. Dissolve the chrome alum in 8 ounces of water; add to the bulk of the solution and the bath is ready for use.

Acid Fixing Bath (*M. D. Miller.*)—Hypo, 8 ounces; water, 1 quart; Lumiere's sodium bisulphite lye, 1 to 2 ounces, to which may be added, if greater hardening is desired, powdered alum, 220 grains.

Fixing Bath for Lantern Slides (*B. H. Allbee*).—Sulphuric acid, 1 dram; hypo, 16 ounces; sulphite soda (dry), 1 ounce; chrome alum, 1 ounce; water, 64 ounces.

Plain Fixing Bath.—Dissolve 1 pound of sodium hyposulphite in 2 quarts of water or 4 ounces of the hypo in a pint of water, according to the bulk of the solution required.

Hardener for Fixing Bath (*Beach*). Water, 40 ounces; sulphite soda (crystals), 6 ounces; powdered alum, 16 ounces; acetic acid, 40 ounces. Add in the order given and shake well until dissolved. Of the above add 16 ounces to each gallon of hyposulphite of soda solution, testing 70 to 80 degrees.

Hardening Negatives.—Immerse them for a few minutes in formalin, 1 ounce; water, 30 ounces.

INTENSIFICATION

Intensifier, One Solution (*F. M. Steadman*). No. 1.—Bichloride of mercury, ½ ounce; water, 10 ounces. No. 2.—Iodide of potassium, 5 drams; water, 1½ ounces. Add to No. 1. No. 3.—Hyposulphite of soda, 1 ounce; water, 2½ ounces. Add to the previous mixture. This clears the solution when it is ready for use for local intensification. For tray intensification add more water to slow its action.

Intensifying with Red Ink (*E. M. Cohen*). Soak the negative well. Put teaspoon of red ink into tray of water and rock until mixed. Immerse negatives face up till w ll and evenly colored, then without washing put in drying frame. If left in solution too long will be over dense, in which case several trays of clear water will eliminate some of the color.

The intensification is permanent without the danger of negative going bad, as is the case when mercury is used.

Intensifier—Mercuric Chloride Process. No. 1.—Mercuric chloride, 200 grains; bromide of potassium, 120 grains; water, 6½ ounces.

No. 2.—Sodium sulphite, 1 ounce; water, 4 ounces. The well-washed negative, free from hypo, must be thoroughly bleached in No. 1; well washed; and then blackened in No. 2. After blackening it is well washed again.

REDUCTION

Reducer, Single Solution (*F. M. Steadman*).—Red prussiate of potash, size of pea; hyposulphite of soda, six times that volume; water, 6 ounces (for local reduction 1½ ounces). When reduced wash thoroughly.

Reducer—Ammonium Persulphate.—Ammonium persulphate, 15 grains; water, 1 ounce. The solution should be made just before use. The negative must be perfectly free from hypo or it will be stained by the persulphate. When the desired reduction has been reached, transfer the negative without washing to a 10 per cent. solution of anhydrous sodium sulphite. Wash finally for 15 or 20 minutes.

Reducer—Farmer's.—Dissolve 1 ounce of potassium ferricyanide in 9 ounces of water and make up to 10 ounces, forming a 10 per cent. solution. Label this poison. Thoroughly wet the negative to be reduced. Take enough fresh plain hypo fixing bath for the purpose, and add to it enough of the ferricyanide solution to make it a light straw color. The negative to be reduced is immersed in this solution, when it will be seen to lose density. Rock the tray to insure evenness of action. This reducer can also be used for local treatment.

PRINTING PROCESSES

Blue Prints.

Blue Printing Sensitizing Formulæ (*Brown*). A.—Dissolve 110 grains ferric ammonium citrate (green) in 1 ounce of water.

B.—Dissolve 40 grains of potassium ferricyanide in 1 ounce of water. These two solutions are made up separately. They are then mixed together and kept in a stoneware bottle, but the single solution should always be filtered before use. The mixture will retain its good qualities for months if kept from the light.

(*Millen*).—Potassium ferricyanide, 1 ounce; ammonio-citrate of iron, 1½ ounces; distilled water, 10 ounces. Mix thoroughly and filter. The solution should have a deep wine color and dry on the paper a lemon-yellow. If the solution is green and has a precipitate, the ammonio-citrate is old and spoiled. The mixture should be kept from the light.

Bromide Paper Developers: Hydroquinone-metol. No. 1.—Water, 10 ounces; hydroquinone, 52 grains; potassium metabisulphite, 18 grains; sodium sulphite, 5 drams; sodium carbonate, 1¼ ounces.

No. 2.—Water, 10 ounces; metol, 30 grains; sodium carbonate, 5 drams; sodium sulphite, 5 drams. One or two drops of a potassium bromide 10 per cent. solution added to 1 ounce of the mixed developer will increase contrast and keep the whites pure. Equal parts of 1 and 2 give excellent prints from a normal negative; one part of 1 and two of 2 give gray prints with maximum half-tone and gradation; two parts of 1 and one of 2 give vigorous prints from soft delicate negatives.

Amidol for rich blacks (freshly prepared). Distilled (or boiled) water, 4 ounces; sodium sulphite (crystals), 90 drams; amidol, 10 to 15 grains. Add a drop of 10 per cent. bromide solution to each ounce of developer.

Sepia Tones: Hypo Alum.—Hyposulphite of soda, 5 ounces; ground alum, 1 ounce; boiling water, 70 ounces. Dissolve the hypo in the water, and then add the alum slowly. A milk-white solution results which should be decanted when clear. It is not used until cold (about 60° Fahr.).

Sepia Tones: Sulphide of Sodium.—The fixed and washed print is treated with one of the following solutions: (1) Potassium ferricyanide, 10 grains; potassium bromide, 10 grains; water, 1 ounce; or (2) potassium ferricyanide, 20 grains; sodium chloride (common salt), 30 grains; water, 1 ounce. The image will be bleached by either of these solutions in a few minutes, the whitish appearance of the deposit being caused by its change into a salt of silver. After 5 minutes in running water apply the sulphuretting solution: Dissolve 3 ounces of sodium monosulphide in 15 ounces of water; boil the solution for about 10 minutes, filter off the black precipitate formed, and when cooled make up to 25 ounces with water. To tone, take 12 per cent. stock sodium sulphide solution, 1 ounce of water, 12 to 20 ounces.

Red Tones: Copper.—Dissolve 100 grains of ammonium carbonate in 2 ounces of water, and in this solution dissolve 10 grains of sulphate of copper. Then add 20 grains of potassium ferricyanide. A clear, dark green solution results which gives a red-chalk tone in about 3 minutes. Tone until the deepest shadow is converted, and then wash the print for 10 minutes.

Green Tones: Vanadium.—Bleach print in the following: Potassium ferricyanide, 10 grains; ammonium carbonate, 100 grains; water, 1 ounce. Wash well and apply: Ferric chloride, 2 grains; vanadium chloride, 2 grains; ammonium chloride, 4 grains; hydrochloric acid, 5 minims; water, 1 ounce.

Blue Tones: Iron.—Bleach print in: Potassium ferricyanide, 10 grains; ammonium carbonate, 100 grains; water, 1 ounce; then tone in ferric chloride, 5 grains; hydrochloric acid, 5 minims; water, 1 ounce.

To prevent blistering on bromide paper (*P. L. Anderson*).—Immerse after fixing and before washing from 10 to 15 minutes in water, 10 ounces; formaldehyde, 1 ounce. A 10 per cent. solution of chrome alum will do equally well.

To make bromide paper translucent (*P. L. Anderson*).—Lay the paper negative face down on a blotter and paint thinly with the following mixture. Give three coats. Turpentine, 3 ounces; powdered resin, 1 ounce; gum elemi, 1 ounce; paraffine wax, ½ ounce. Heat with stirring until it begins to boil. Allow to cool slightly and add turpentine, 3 ounces.

Carbon Tissue.

Carbon Tissue, Sensitizer for (Bennett).—Potassium bichromate, 4 drams; citric acid, 1 dram; strong ammonia water, about 3 drams; water, 25 ounces; dissolve the bichromate and citric acid in hot water, and add sufficient ammonia to change the orange color of the solution to lemon-yellow. Sensitize for 90 seconds; reducing the water softens the gradation in the print; increasing it to 30 ounces gives more vigor.

Carbon Lantern Slides.—Prepare the glass by coating with the following preparation: 180 grains of Nelson's Gelatine No. 1, in 20 ounces water. Add 10 grains bichromate of potash. Dry and allow the plate to be exposed to light for a couple of days to make the coating thoroughly insoluble. Sensitizer for tissue: 1 per cent. to 1¼ per cent. solution of bichromate of potash. Immerse 2 minutes. Print deeply; expose twice as long as ordinary paper print. Develop in hot water as usual.

Gum Bichromate.

Gum Bichromate (Caspar Millar). A.—Gum arabic, 1¼ ounces; water, 3½ ounces; salicylic acid, 4 grains.

B.—Chrome alum, 45 grains; water, 3½ ounces. Grind A and B with water and pigment, brush over paper, dry and store.

Suggested formula.—A, 2 ounces; B, 1½ drams; carbon black, 10 grains; sensitize for 2 minutes in 5 per cent. bichromate solution.

Kallitype.

Kallitype Sensitizer for Black Tones (J. Thomson).—Distilled water, 1 ounce; ferric oxalate (Merck's or Mallinckrodt's) 15 grains; citrate of iron and ammonia (brown scales), 25 grains; chloride of copper, 8 grains; oxalate of potassium, 35 grains; oxalic acid, 15 grains; silver nitrate, 15 grains; gum arabic, 10 grains. For greater contrast add 1 to 10 drops 5 per cent. bichromate of potassium solution.

Developer: Stock Solution.—Distilled water, 1 ounce; silver nitrate, 40 grains; citric acid, 10 grains; oxalic acid, 10 grains. Filter. Normal developer 1 dram stock solution and 7 drams of water.

Platinum Papers.

Platinum Sensitizer (P. L. Anderson).—No. 1. Oxalic acid, 16 grains; ferric oxalate, 240 grains; distilled water (hot), 16 drams; oxalic acid, 16 grains. No. 2. Ferric oxalate, 240 grains; potassium chlorate, 4 grains; distilled water (hot), 16 drams. No. 3. Potassium chloroplatinite, 219 grains; distilled water, 19 drams. For use take No. 1, 14 mm.; No. 2, 8 mm.; No. 3, 28 mm.

Platinum: Sensitizing Gold Bath and Sepia Papers. A.—Chloroplatinite of potassium, 15 grains; distilled water, 90 minims.

B.—Ferric oxalate, 21 grains; oxalic acid, 2 grains; distilled water, 183 minims. For cold bath paper, mix A and B, and add 15 minims of water. For sepia paper mix A and B and add 15 minims of a 5 per cent. solution of mercuric chloride. The addition of a few grains of potassium chlorate to any of the above gives increased contrast in the print. From 140 to 170 minims of solution are sufficient to coat a sheet of paper 20 x 26 inches.

Platinum Prints: to Intensify. A.—Sodium formate, 45 grains; water, 1 ounce.

B.—Platinum perchloride, 10 grains; water, 1 ounce.

C.—For use, take 15 minims each of A and B to 2 ounces of water. Immerse prints until sufficiently intensified, then remove and wash.

Platinum Prints to Distinguish from Bromide.—Soak the print in saturated solution of mercuric chloride; a platinum print will not change; a bromide print will bleach.

Salted Papers.

Salted Paper Prints: Sensitized with the following:—Silver, 480 grains Troy; water, 11 ounces. Dissolve and pour off 2 ounces, and to the 9 ounces left add strong aqua ammonia to form a precipitate and redissolve the precipitate, then add the remaining 2 ounces which will form another precipitate, to this add 9 drops of nitric acid C. P. Apply this to the paper with a tuft of cotton.

Any good Toning Bath will give good results, such as: Chloride Aluminum, 80 grains; bi-carbonate soda, 360 grains; water, 48 ounces. When mixed this will form a flocky hydrate which will settle to the bottom. It can be strained through clean washed muslin. To prepare a small bath for toning, take 12 ounces of the stock solution and add sufficient gold to tone in 8 to 10 minutes. The gold solution must be neutralized with bi-carbonate soda before adding to the above bath. When the prints reach the desired tone throw them into a bath of salt water, made of water, 1 gallon; table salt, 1 ounce.

Printing Out Papers.

Gold Toning (B. H. Allbee). No. 1, 10 per cent. solution sulphocyanide of potassium; No. 2, 15 grains chloride of gold in 7½ ounces of water; No. 3, 10 per cent. solution phosphate of soda; No. 4, saturated solution borax. Take No. 1, 1 dram, water, 8 drams; No. 2, 4 drams; No. 3, 1 dram; No. 4, 2 drams. In this put print in dry. Toning should be complete in two minutes. Wash as usual.

Gold Toning.—For blue-black tones, for slight strengthening, and for converting rusty black into pure black. Soak print in warm water, lay on warm glass, brush over glycerine and blot off. Pour on few minims of solution of gold chloride (1 grain per dram), and rapidly brush in all directions. When toned, rinse, and sponge back and front with: Metol, 50 grains; sodium sulphite, 1 ounce; potassium carbonate, ½ ounce; water, 20 ounces. Tone in daylight. Do not tone sepias or old prints in this solution.

MISCELLANEA

Adhesive for Labels.—Soak 1 part of the best glue in water until thoroughly swollen, add a little sugar candy, 1 part of gum arabic and 6 parts of water. Boil with constant stirring over a spirit lamp until the whole gets thin. Coat sheets of paper with it; let dry and cut up into convenient sizes.

Autochromes.—Sensitizing to get more speed. (M. G. Lovelace.) In complete darkness bathe plates in the following solution: Distilled water, 66 cc.; ethyl alcohol pure 90 deg., 33 cc.; dye solution, 2 cc.; ammonia, .30 cc. The dye solution is a mixture of pinachrome, pina verdol and pinacyanol, 1 part of each in 1000 of alcohol. Bathe plates for five minutes and dry away from dust. These plates require a special filter the formula being: Hard gelatine, 3 gms.; distilled water, 100 cc.; filter yellow K, 1 per cent. solution 2.5 cc. Use 1 cc. to each 10 square centimeters of surface. These plates have about five times the speed and it is possible to make snap shots with them if a lens working at F/4.5 and F/5.6 is used.

Blacking Mixture.—Dissolve a 4-ounce stick of licorice in 8 ounces of water with the aid of gentle heat. When dissolved rub into the mixture 1 ounce of burnt sienna in powder, using the back of a spoon for this purpose. When cold, bottle for use.

Blackening Brass.—Make two solutions: Copper nitrate, 200 grains; water, 1 ounce. Silver nitrate, 200 grains; water, 1 ounce. Mix the solutions; clean the article well; dip it in the solution for a moment; withdraw it; dry it; and heat it strongly.

Black, Dead, for Wood.—Shellac, 40 parts; borax, 20 parts; glycerine, 20 parts; water, 500 parts. When dissolved, add 50 parts aniline black.

Cleaning Greasy Bottles.—Wash with benzine, or permanganate of potassium, to which has been added some hydrochloric acid.

Bottles that have contained resinous substances, wash with potash or soda and rinse with alcohol. Bottles that have contained essences, wash with sulphuric acid, then with water.

Clearing Stained Negatives.—Dissolve ⅛ ounce of pulverized alum in 20 ounces of water and add 1 dram of sulphuric acid. Immerse the stained plate in this solution for a few minutes; remove plate, wash, and then set in the rack to dry.

Film: to Remove from Glass: Make two solutions. A.—Sodium fluoride, 6 grains; water, 4 ounces.

B.—Sulphuric acid, 6 drops; water, 1 ounce. Place the negative in solution A for 2 minutes and then place directly in solution B. After another 2 minutes lift the film with the finger from one corner of the plate. It will soon leave the glass.

Firelight Effects on Developing Paper (*H. S. Hood*). No. 1.—Water, 5 drams; copper sulphate, 10 per cent. solution, 15 minims; ammonium carbonate, 10 per cent. solution. Add till precipitate first formed is redissolved.

No. 2.—Water, 4½ ounces; potassium ferricyanide, 6/10 drams. Mix separately and add No. 2 to No. 1. The print will turn bright red. Wash well.

Ground Glass: Substitutes for. 1.—Paraffine wax makes an excellent substitute for ground glass if the latter should get broken. Iron the paper onto a sheet of plain glass. It is more transparent than the focusing screen and the image will appear clearer; hence, in exposing allowance must be made for the difference in illumination.

2.—Resin dissolved in wood alcohol and blown over the glass; this must not be scratched; it gives a very fine-grained ground glass effect.

3.—White wax, 120 grains; ether, 1 ounce.

Ground Glass Varnish: Sandarac, 90 grains; mastic, 20 grains; ether, 2 ounces. Dissolve the resins in the ether and add benzole ½ to 1½ ounces.

Lens: to Clean.—The lens should alwavs be kept free from dust or other impurities. To clean it, spread upon a table a clean sheet of paper; take the lens apart, and with a camel-hair brush dust each of the combinations on both sides. If the surfaces of the lenses are very dirty and have lost their polish, make up the following: Nitric acid, 3 drops; alcohol, 1 ounce; distilled water, 2 ounces. Dip a tuft of filtering cotton in this solution, rub each side of the lens, then polish with an absolutely clean chamois. Clean the lens tube before replacing the lenses, each of which should be finally dusted with a camel-hair brush.

Moonlight Effects on Developing Paper (*H. S. Hood*).—Immerse in water, 5 ounces; ferric ammonium citrate, 12 grains; potassium ferricyanide, 12 grains; nitric acid, 2/5 drams. Prints will assume a blue color. Wash until whites become clear.

Mounting Without Cockling (*W. S. Davis*).—Coat back of dry print with as strong a solution of warm gelatine (pure table gelatine will do) as can be spread easily. Allow to dry, then attach to mount by dampening the mount with water, then lay print in desired position; cover with a sheet of bond or smooth paper, and apply a warm flat iron until the gelatine melts. Very effective for thin mounting material, as there is no cockling if the mount contains just the right amount of water when the iron is applied.

Non-Abrasion Soda Mixture (*M. G. Lovelace*).—Sodium sulphite, 1 ounce; sodium carbonate, 370 grains; hypo, 8 grains. A mixture in these proportions may be used in place of sodas for paper; or sodium carbonate, 28.75 grams; hypo, 38.75 grams; water to 500.00 cc.

A MISTY MORNING. A. W. H. Weston.

Paste, Starch (*A. Lomax*). Powdered starch, 1 ounce; cold water, 12 ounces. Mix smooth with a glass rod, heat to boiling point. Boil half a minute stirring all the time. Use cold.

Poisons and Antidotes.—Administer the antidote as soon as possible. If a strong acid or alkali, or cyanide of potassium, has been swallowed, lukewarm water in large quantities should be swallowed at once. Where strong acids or alkalies have not been swallowed, rid the stomach of the poison by vomiting; for this purpose take 25 grains of zinc sulphate in warm water.

Polished surfaces: to Photograph.—Smear the surface with soft putty so as to deaden the reflections. Photograph the article against a black background, and stop off all reflections, allowing the light to come from one direction only. To photograph hollow cut glassware fill with ink or aniline black water dye. Before photographing machinery deaden the bright parts with putty.

Safe Light for Panchromatic Plates.—Take old dry plates and coat with the following: Water, 10 ounces; tartrazine, 75 grains; patent blue A, 75 grains; naphthol greens, 75 grains; sulphuric acid, 30 minims. Stain the plates as deeply as possible. Use two plates.

Stains: to Remove from the Hands.—Developer stains: solution of citric or oxalic acid. Silver nitrate stains: Water, 4 ounces; chloride of lime, 350 grains; sulphate of soda, 1 ounce. Apply with a brush.

Tarnished Daguerreotypes, to Restore.—Remove the silvered plate from the case and place it, image uppermost, under a box lid or other protector from dust, etc. Put a small piece of potassium cyanide into a graduate and pour over it 1 or 2 ounces of water. Hold the daguerreotype by the corner with a pair of pliers, rinse it in clear running water, then pour over it the weak cyanide solution (a 3 per cent. solution is usually employed), and return it to the graduate. Repeat this operation several times until the discoloration quite disappears. Wash well in running water, and then, before the surplus water has time to collect in tears upon the image, begin to dry the plate gradually over a spirit lamp, holding the plate in an inclined position so that it will dry from the uppermost corner. The secret of success is in the use of pure water for the final washings and the drying of the image without check or the formation of tears.

Test for Hypo: Potassium permanganate, 2 grains; potassium carbonate, 20 grains; distilled water, 40 ounces. Soak the plate or print to be treated in water for one hour, then remove and add to the water a few drops of the above solution, which will turn a greenish yellow or brown if the water is not free from hypo.

Varnish for Negatives and Lantern Slides.—Dissolve 1 part of gum sandarac in 25 parts of benzole. Apply cold.

Protective Varnish for Labels.—Use waterproof ink when writing on the paper. Dry and coat with the following varnish: Cut into fine shreds an old celluloid negative film from which all traces of gelatine have been removed. Put the shreds in a small bottle; half fill with amyl acetate and then add wood alcohol or methylated spirit which will dissolve the celluloid.

Retouching Mediums. (1)—Pure alcohol, 2 parts; sandarac, 1 part; benzine, 4 parts; acetone, 4 parts.

(2)—A simple medium is made by dissolving a little resin in turpentine.

Retouching Mediums.—Gum dammar, 10 grains, and add it to oil of turpentine, 1 ounce; Canada balsam (about) 5 grains. Shake occasionally until all is dissolved.

Waxing Solution: Spirits of turpentine, 6 ounces; Japan drier (white), 4½ ounces. Sprinkle the fluid on the print and rub in with cheesecloth.

THE ELEMENTS:

THEIR NAMES, SYMBOLS, AND ATOMIC WEIGHTS OXYGEN STANDARD.

Compiled by HENRY F. RAESS.

Aluminum	Al	27.10	Gold	Au	197.20	Radium	Rd	226.40
Amarillium	?	?	Helium	He	3.96	Rhodium	Rh	102.90
Antimony	Sb	120.20	Holmium	Ho	163.50	Rubidium	Rb	85.45
Argon	A	39.88	Hydrogen	H	1.008	Ruthenium	Ru	101.70
Arsenic	As	74.96	Indium	In	114.80	Samarium	Sm	150.40
Barium	Ba	137.37	Iodine	I	126.92	Scandium	Sc	44.10
Bismuth	Bi	208.00	Iridium	Ir	193.10	Selenium	Se	79.20
Boron	B	11.00	Iron	Fe	55.84	Silicon	Si	28.30
Bromine	Br	79.92	Krypton	Kr	82.92	Silver	Ag	106.88
Cadmium	Cd	114.40	Lanthanum	La	139.00	Sodium	Na	23.00
Caesium	Cs	132.81	Lead	Pb	207.10	Strontium	Sr	87.63
Calcium	Ca	40.07	Lithium	Li	6.94	Sulphur	S	32.07
Canadium	?	?	Lutecium	Lu	174.00	Tantalum	Ta	181.50
Carbon	C	12.00	Magnesium	Mg	24.32	Tellurium	Te	127.50
Cerium	Ce	140.25	Manganese	Mn	54.93	Terbium	Tb	159.20
Chlorine	Cl	35.46	Mercury	Hg	200.60	Thallium	Tl	204.00
Chromium	Cr	52.00	Molybdenum	Mo	96.00	Thorium	Th	232.40
Cobalt	Co	58.97	Neodymium	Nd	144.30	Thulium	Tm	168.50
Columbium	Cb	93.50	Neon	Ne	20.20	Tin	Sn	119.00
Copper	Cu	63.57	Nickel	Ni	58.68	Titanium	Ti	48.10
?	Ct	176.00	Niton	Nt	222.40	Tungsten	W	184.00
Dysprosium	Dy	162.50	Nitrogen	N	14.01	Uranium	U	238.50
Erbium	Er	167.70	Osmium	Os	190.90	Vanadium	V	51.00
Europium	Eu	152.00	Oxygen	O	16.00	Xenon	Xe	130.20
Fluorine	F	19.00	Palladium	Pd	106.70	Ytterbium	Yb	172.00
Gadolinium	Gd	157.30	Phosphorus	P	31.04	Yttrium	Yt	89.00
Gallium	Ga	69.90	Platinum	Pt	195.20	Zinc	Zn	65.37
Germanium	Ge	72.50	Potassium	K	39.10	Zirconium	Zr	90.60
Glucinum	Gl	9.10	Praseodymium	Pr	140.60			

TABLE OF COMPARATIVE PLATE SPEED NUMBERS

H & D	Watkins P No.	Wynne F No.	H & D	Watkins P No.	Wynne F No.
10	15	24	220	323	114
20	30	28	240	352	120
40	60	49	260	382	124
80	120	69	280	412	129
100	147	77	300	441	134
120	176	84	320	470	138
140	206	91	340	500	142
160	235	103	380	558	150
200	294	109	400	588	154

The above Watkins and Wynne numbers are equivalent to the H and D, only when the latter is determined in accordance with the directions of Hurter and Driffield, that is with pyro-soda developer and using the straight portion only of the density curve.

To convert H and D into Watkins: Multiply H and D by 50 and divide by 34. For all practical purposes the Watkins P number is 1½ times H and D.

To convert Watkins into Wynne F Nos.: Extract the square root and multiply by 6.4.

The above methods have been approved by the Watkins Meter Company and the Infallible Exposure Meter Company.

TABLE OF SOLUBILITIES OF THE MORE COMMON CHEMICALS USED IN PHOTOGRAPHY

Sol.—Soluble. V.S.—Very Soluble. S.S.—Slightly Soluble.
Dec.—Decomposed. Insol.—Insoluble.

One Part is Soluble in—Parts of Water

	Cold	Hot
Acetone, Sulphite	1	..
Acid, Citric	0.75	0.50
Acid, Gallic	100	0.3
Acid, Oxalic	9	0.3
Acid, Pyrogallic	2	V.S.
Acid, Tannic	0.6	..
Acid, Tartaric	0.75	.5
Alum	8	.25
Alum, Chrome	6	Dec.
Aluminum, Chloride	0.25	V.S.
Amidol	4	V.S.
Ammonium, Bichromate	5	.25
Ammonium, Bromide	1.3	0.7
Ammonium, Carbonate	4	Dec.
Ammonium, Citrate	0.5	V.S.
Ammonium, Iodide	0.75	V.S.
Ammonium, Nitrate	1	V.S.
Ammonium, Persulphate	1.5	Dec.
Ammonium, Sulphocyanide	0.6	V.S.
Borax	12.5	2
Cadmium, Bromide	1	V.S.
Cadmium, Chloride	0.7	V.S.
Cadmium, Iodide	1	.75
Caustic Potash—Pot. Hydrate	0.5	.25
Caustic Soda—Soda Hydrate	1.5	.5
Copper, Chloride	1	.75
Copper, Sulphate	3	1
Edinol	1	5
Gold, Chloride	V.S.	V.S.
Hydroquinone	17	..
Ferric, Chloride	0.75	.5
Ferric, Amm. Citrate	4	..
Ferric, Potassium Oxalate	15	0.85
Ferric, Sodium Oxalate	1.69	0.55
Ferrous, Sulphate	1.5	.05
Ferrous, Oxalate	Insol.	..
Lead, Acetate	2	1
Lead, Nitrate	2	.7
Mercury, Bichloride	18	2
Metol	Sol.	..
Ortol	Sol.	..

	Cold	Hot
Potassium, Bicarbonate	3.5	Dec.
Potassium, Bichromate	10	1
Potassium, Bromide	1.5	1
Potassium, Carbonate	.9	0.50
Potassium, Chloroplatinite	6	V.S.
Potassium, Cyanide	1	0.5
Potassium, Ferricyanide	2.5	1.3
Potassium, Ferrocyanide	3	1.5
Potassium, Iodide	0.75	0.5
Potassium, Metabisulphite	Sol.	Dec.
Potassium, Oxalate	3	2
Potassium, Permanganate	16	10
Potassium, Persulphate	50	Dec.
Potassium, Sulphocyanide	1	0.5
Pyrocatechin	1.25	V.S.
Rochelle Salt	1.5	V.S.
Silver, Nitrate	.75	.25
Sodium, Acetate	3	.5
Sodium, Bicarbonate	12	Dec.
Sodium, Bisulphite	V.S.	..
Sodium, Bromide	1.25	1
Sodium, Carbonate (dry)	6	2.2
Sodium, Carbonate (crys't)	1.5	V.S.
Sodium, Chloride	3	2.5
Sodium, Citrate	1	.5
Sodium, Hyposulphite	1.5	1
Sodium, Iodide	.5	.3
Sodium, Phosphate	6.7	1
Sodium, Sulphide	V.S.	V.S.
Sodium, Sulphite (dry)	4	2
Sodium, Sulphite (crys't)	2.2	1
Sodium, Tungstate	8–12	S.
Uranium, Chloride	V.S.	V.S.
Uranium, Nitrate	.5	.25
Uranium, Sulphate	.5	.25

TABLES OF DISTANCES AT AND BEYOND WHICH ALL OBJECTS ARE IN FOCUS WHEN SHARP FOCUS IS SECURED ON INFINITY

Focal Length of Lens in Inches	Ratio marked on Stops													
	f/4	*f*/5.6	*f*/6	*f*/7	*f*/8	*f*/10	*f*/11	*f*/15	*f*/16	*f*/20	*f*/22	*f*/32	*f*/44	*f*/6
	Number of feet after which all is in focus													
4	33	24	22	19	17	13	12	9	8	7	6	4	3	2
4¼	38	27	25	21	19	15	14	10	10	7	7	5	3½	2½
4½	42	30	28	24	21	17	15	11	11	8½	7½	5½	4	3
4¾	47	34	31	27	24	19	17	12	12	9½	8½	6	5	3
5	52	36	35	30	26	21	19	14	13	10½	9½	6½	5½	3½
5¼	57	40	38	33	28	23	21	15	14	11½	10½	7	5½	3½
5½	63	45	43	36	31	25	23	17	15	12½	11½	7½	6	4
5¾	68	50	46	38	34	27	25	18	17	13½	13	8½	6½	4
6	75	54	50	42	38	30	28	20	19	15	14	9	7	4½
6¼	81	58	54	46	40	32	29	22	20	16	15	10	7½	5
6½	87	62	58	50	44	35	32	23	22	17½	16	11	8	5½
6¾	94	67	63	54	47	38	34	25	24	19	17	12	8½	6
7	101	72	68	58	51	40	37	27	25	20	18	12½	9	6
7¼	109	78	73	62	54	44	39	29	27	22	20	13½	10	6½
7½	117	83	78	64	58	47	42	31	29	24	21	14½	10½	7
7¾	124	90	83	71	62	50	45	33	31	25	22	15½	11	7½
8	132	96	88	76	68	52	48	36	32	28	24	16	12	8
8¼	141	100	94	80	71	56	51	37	35	29	25	17½	12½	8½
8½	150	104	100	84	76	60	56	40	38	30	27	19	13½	9
8¾	156	111	104	89	78	63	57	42	39	32	29	20	14	10
9	168	120	112	96	84	67	61	45	42	34	31	21	15	10½
9¼	180	127	116	101	90	71	65	47	45	35	32	22	16	11
9½	190	133	125	107	95	75	68	50	47	37	34	24	17	12
9¾	197	141	131	113	99	79	72	52	50	39	36	25	18	12½
10	208	148	140	120	104	83	75	55	52	42	38	26	19	13

If sharp focus is secured on any of the distances shown, then, with the stop indicated all objects are in focus from half the distance focused on up to infinity.

LENGTH OF STUDIO

REQUIRED FOR LENSES OF DIFFERENT FOCAL LENGTHS FROM 6 TO 8 FEET IS ALLOWED FOR THE CAMERA AND OPERATOR

From "Photographic Lenses" by BECK and ANDREWS

Focus of Lens	Size	Kind of Portrait	Length of Studio	Dist. of Lens from Object
Inches			In Feet	In Feet
6	Carte de Visite 3¼x4¼	Full Length	18 to 20	11 to 12
7½	Carte de Visite	Full Length	22 to 25	14 to 15
8½	Carte de Visite	Full Length	24 to 28	17 to 19
		Bust	10 to 15	5
9½	Cabinet and smaller groups	Full Length	20 to 23	12 to 13
		Bust	12 to 17	7
11	Cabinet and 5x7 groups	Full Length	25 to 30	17 to 18
		Bust	13 to 20	8
14½	Cabinets, panels and 6½x8½ groups	Full Length	32 to 40	23 to 24
		Bust	14 to 20	7
19	10x12 portraits or groups	Full Length	20 to 25	13
		Bust	14 to 20	7
24	16x20 portraits or groups	Full Length	25 to 30	14
		Bust	14 to 20	8

TABLE FOR CALCULATING DISTANCES IN ENLARGING OR REDUCING

From The British Journal Photographic Almanac

Focus of Lens	Times of Enlargement and Reduction							
Inches	1 Inch	2 Inches	3 Inches	4 Inches	5 Inches	6 Inches	7 Inches	8 Inches
2..........	4 4	6 3	8 2 2/3	10 2 1/2	12 2 2/5	14 2 1/3	16 2 2/7	18 2 1/4
2 1/2........	5 5	7 1/2 3 3/4	10 3 1/3	12 1/2 3 1/8	15 3	17 1/2 2 9/10	20 2 6/7	22 1/2 2 3/16
3..........	6 6	9 4 1/2	12 4	15 3 3/4	18 3 3/5	21 3 1/2	24 3 3/7	27 3 3/8
3 1/2........	7 7	10 1/2 5 1/4	14 4 2/3	17 1/2 4 3/4	21 4 1/5	24 1/2 4 1/12	28 4	31 1/2 3 9/10
4..........	8 8	12 6	16 5 1/3	20 5	24 4 4/5	28 4 2/3	32 4 4/7	36 4 1/2
4 1/2........	9 9	13 1/2 6 3/4	18 6	22 1/2 5 3/5	27 5 2/5	31 1/2 5 1/4	36 5 1/7	40 1/2 5 1/16
5..........	10 10	15 7 1/2	20 6 2/3	25 6 1/4	30 6	35 5 5/6	40 5 5/7	45 5 5/8
5 1/2........	11 11	16 1/2 8 1/4	22 7 1/3	27 1/2 6 4/5	33 6 1/2	38 1/2 6 5/12	44 6 2/7	49 1/2 6 3/16
6..........	12 12	18 9	24 8	30 7 1/2	36 7 1/5	42 7	48 6 6/7	54 6 3/4
7..........	14 14	21 10 1/2	28 9 1/3	35 8 3/4	42 8 2/5	49 8 1/6	56 8	63 7 7/8
8..........	16 16	24 12	32 10 2/3	40 10	48 9 3/5	56 9 1/3	64 9 1/7	72 9
9..........	18 18	27 13 1/2	36 12	45 11 1/4	54 10 4/5	63 10 1/2	72 10 2/7	81 10 1/8

The object of this table is to enable any manipulator who is about to enlarge (or reduce) a copy any given number of times to do so without troublesome calculation. It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately from its optical center. The use of the table will be seen from the following illustration: A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of 6 inches equivalent focus. He must therefore look for 4 on the upper horizontal line and for 6 on the first vertical column and carry his eye to where these two join, which will be 30-7½. The greater of these is the distance the sensitive plate must be from the center of the lens; and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times, the same method must be followed; but in this case the greater number will represent the distance between the lens and the picture to be copied, the latter that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be 12 inches, as this number is not in the column of focal lengths, look out for 6 in this column and multiply by 2, and so on with any other numbers.

ENGLISH WEIGHTS AND MEASURES

APOTHECARIES' WEIGHT

20 Grains	=	1 Scruple	=	20 Grains.
3 Scruples	=	1 Drachm	=	60 Grains.
8 Drachms	=	1 Ounce	=	480 Grains.
12 Ounces	=	1 Pound	=	5,760 Grains.

FLUID MEASURE

60 Minims	=	1 Fluid Drachm
8 Drachms	=	1 Fluid Ounce
20 Ounces	=	1 Pint
8 Pints	=	1 Gallon

The above weights are usually adopted in formulas.

All Chemicals are usually sold by

AVOIRDUPOIS WEIGHT

27 11/32	Grains	=	1 Drachm	=	27 11/32	Grains
16	Drachms	=	1 Ounce	=	437½	Grains
16	Ounces	=	1 Pound	=	7,000	Grains

Precious Metals are usually sold by

TROY WEIGHT

24 Grains	=	1 Pennyweight	=	24 Grains
20 Pennyweights	=	1 Ounce	=	480 Grains
12 Ounces	=	1 Pound	=	5,760 Grains

NOTE.—An ounce of metallic silver contains 480 grains, but an ounce of nitrate of silver contains only 437½ grains.

UNITED STATES FLUID MEASURE

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Grains.	Cub. C.M.
1	= 8	= 128	= 1,024	= 61,440	= 231.	= 58,328.886	= 3,785.44
	1	= 16	= 128	= 7,680	= 28.875	= 7,291.1107	= 473.18
		1	= 8	= 480	= 1.8047	= 455.6944	= 29.57
			1	= 60	= 0.2256	= 56.9618	= 3.70

IMPERIAL BRITISH FLUID MEASURE

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Hrains.	Cub. C.M.
1	= 8	= 160	= 1,280	= 76,800	= 277.27384	= 70,000	= 4,543.732
	1	= 20	= 160	= 9,600	= 34.65923	= 8,750	= 567.966
		1	= 8	= 480	= 1.73296	= 437.5	= 28.398
			1	= 60	= 0.21662	= 54.69	= 3.550

CHILD PORTRAIT. May L. Smith.

METRIC SYSTEM OF WEIGHTS AND MEASURES

MEASURES OF LENGTH

Denominations and Values		Equivalents in Use	
Myriameter	10,000 meters.	6.2137	miles.
Kilometer	1,000 meters.	.62137	mile, or 3,280 ft. 10 ins.
Hectometer	100 meters.	328.	feet and 1 inch.
Dekameter	10 meters.	393.7	inches.
Meter	1 meter.	39.37	inches.
Decimeter	1-10th of a meter.	3.937	inches.
Centimeter	1-100th of a meter.	.3937	inch.
Millimeter	1-1000th of a meter.	.0394	inch.

MEASURES OF SURFACE

Denominations and Values		Equivalents in Use	
Hectare	10,000 square meters.	2.471	acres.
Are	100 square meters.	119.6	square yards.
Centare	1 square meter.	1,550.	square inches.

MEASURES OF VOLUME

Denominations and Values			Equivalents in Use			
Names	No. of Liters	Cubic Measures	Dry Measure		Wine Measure	
Kiloliter or stere	1,000	1 cubic meter.	1.308	cubic yards.	264.17	gallons.
Hectoliter	100	1-10th cubic meter.	2	bu. and 3.35 pecks.	26.417	gallons.
Dekaliter	10	10 cubic decimeters.	9.08	quarts.	2.6417	gallons.
Liter	1	1 cubic decimeter.	.908	quart.	1.0567	quarts.
Deciliter	1–10	1-10th cubic decimeter.	6.1023	cubic inches.	.845	gill.
Centiliter	1–100	10 cubic centimeters	.6102	cubic inch.	.338	fluid oz.
Milliliter	1–1000	1 cubic centimeter.	.061	cubic inch.	.27	fl. drm.

WEIGHTS

Denominations and Values			Equivalents in Use	
Names	Number of Grams	Weight of Volume of Water at its Maximum Density	Avoirdupois Weight	
Millier or Tonneau	1,000,000	1 cubic meter.	2204.6	pounds.
Quintal	100,000	1 hectoliter.	220.46	pounds.
Myriagram	10,000	10 liters.	22.046	pounds.
Kilogram or Kilo	1,000	1 liter.	2.2046	pounds.
Hectogram	100	1 deciliter.	3.5274	ounces.
Dekagram	10	10 cubic centimeters.	.3527	ounce.
Gram	1	1 cubic centimeter.	15.432	grains.
Decigram	1–10	1-10th of a cubic centimeter.	1.5432	grain.
Centigram	1–100	10 cubic millimeters.	.1543	grain.
Milligram	1–1000	1 cubic millimeter.	.0154	grain.

For measuring surfaces, the square dekameter is used under the term of ARE; the hectare, or 100 ares, is equal to about 2½ acres. *The unit of capacity* is the cubic decimeter or LITER, and the series of measures is formed in the same way as in the case of the table of lengths. The cubic meter is the unit of measure for solid bodies, and is termed STERE. *The unit of weight* is the GRAM, which is the weight of one cubic centimeter of pure water weighed in a vacuum at the temperature of 4 deg. Cent. or 39.2 deg. Fahr., which is about its temperature of maximum density. In practice, the term cubic centimeter, abbreviated c.c., is generally used instead of milliliter, and cubic meter instead of kiloliter.

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH MEASURE

1 cubic centimeter	=	17 minims				
2 cubic centimeters	=	34 "				
3 "	=	51 "				
4 "	=	68 "	or	1 dram	8 minims	
5 "	=	85 "	"	1 "	25 "	
6 "	=	101 "	"	1 "	41 "	
7 "	=	118 "	"	1 "	58 "	
8 "	=	135 "	"	2 drams	15 "	
9 "	=	152 "	"	2 "	32 "	
10 "	=	169 "	"	2 "	49 "	
20 "	=	338 "	"	5 "	38 "	
30 "	=	507 "	"	1 ounce	0 dram	27 minims
40 "	=	676 "	"	1 "	3 drams	16 "
50 "	=	845 "	"	1 "	6 "	5 "
60 "	=	1014 "	"	2 ounces	0 "	54 "
70 "	=	1183 "	"	2 "	3 "	43 "
80 "	=	1352 "	"	2 "	6 "	32 "
90 "	=	1521 "	"	3 "	1 "	21 "
100 "	=	1690 "	"	3 "	4 "	10 "
1000 "	=	1 liter = 34 fluid ounces nearly, or 2⅛ pints.				

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH WEIGHT

The following table, which contains no error greater than one-tenth of a grain, will suffice for most practical purposes:

1 gram	=	15⅖ grains.			
2 grams	=	30⅘ "			
3 "	=	46⅕ "			
4 "	=	61⅘ "	or	1 dram	1⅘ grains
5 "	=	77⅕ "	"	1 "	17⅕ grain
6 "	=	92⅗ "	"	1 "	32⅗ "
7 "	=	108 "	"	1 "	48 "
8 "	=	123⅖ "	"	2 drams	3⅖ "
9 "	=	138⅘ "	"	2 "	18⅘ "
10 "	=	154⅖ "	"	2 "	34⅖ "
11 "	=	169⅘ "	"	2 "	49⅘ "
12 "	=	185⅕ "	"	3 "	5⅕ "
13 "	=	200⅗ "	"	3 "	20⅗ "
14 "	=	216 "	"	3 "	36 "
15 "	=	231⅖ "	"	3 "	51⅖ "
16 "	=	247 "	"	4 "	7 "
17 "	=	262⅖ "	"	4 "	22⅖ "
18 "	=	277⅘ "	"	4 "	37⅘ "
19 "	=	293⅕ "	"	4 "	53⅕ "
20 "	=	308⅗ "	"	5 "	8⅗ "
30 "	=	463 "	"	7 "	43 "
40 "	=	617⅕ "	"	10 "	17⅕ "
50 "	=	771⅗ "	"	12 "	51⅗ "
60 "	=	926 "	"	15 "	26 "
70 "	=	1080⅕ "	"	18 "	0⅕ "
80 "	=	1234⅗ "	"	20 "	34⅗ "
90 "	=	1389 "	"	23 "	9 "
100 "	=	1543⅕ "	"	25 "	43⅕ "
1000 "	=	1 kilogram = 32 oz., 1 dr., 12⅖ gr.			

"UNIFORM SYSTEM" NUMBERS FOR STOPS FROM $\frac{f}{1}$ TO $\frac{f}{100}$

In the following table Mr. S. A. Warburton calculated the exposure necessary with every stop from $\frac{f}{1}$ to $\frac{f}{100}$ compared with the unit stop of the "uniform system" of the Photographic Society of Great Britain. The figures which are underlined show in the first column what $\frac{f}{a}$ must be in order to increase the exposure in geometrical ratio from $\frac{f}{4}$, the intermediate numbers showing the uniform system number for any other aperture.

f	U. S. No.
1	1/16
1¼	.097
1.414	⅛
1½	.140
1¾	.191
2	¼
2¼	.316
2½	.390
2.828	½
2¾	.472
3	.562
3¼	.660
3½	.765
3¾	.878
4	1
4¼	1.12
4½	1.26
4¾	1.41
5	1.56
5¼	1.72
5½	1.89
5.656	2
5¾	2.06
6	2.25
6¼	2.44
6½	2.64
6¾	2.84
7	3.06
7¼	3.28
7½	3.51
7¾	3.75
8	4
8¼	4.25
8½	4.51
8¾	4.78
9	5.06
9¼	5.34
9½	5.64
9¾	5.94
10	6.25
11	7.56
11.31	8
12	9.00
13	10.56
14	12.25
15	14.06
16	16
17	18.06
18	20.25
19	22.56
20	25.00
21	27.56
22	30.25
22.62	32
23	33.06
24	36.00
25	39.06
26	42.25
27	45.56
28	49.00
29	52.56
30	56.25
31	60.06
32	64
33	68.06
34	72.25
35	76.56
36	81.00
37	85.56
38	90.25
39	95.06
40	100.00
41	105.06
42	110.25
43	115.56
44	121.00
45	126.56
45.25	128
46	132.25
47	138.06
48	144.00
49	150.06
50	156.25
51	162.56
52	169.00
53	175.56
54	182.25
55	189.06
56	196.00
57	203.06
58	210.25
59	217.56
60	225.00
61	232.56
62	240.25
63	248.06
64	256
65	264.06
66	272.25
67	280.56
68	289.00
69	297.56
70	306.25
71	15.06
72	324.00
73	333.06
74	342.25
75	351.56
76	361.00
77	370.56
78	380.25
79	390.06
80	400.00
81	410.06
82	420.25
83	430.56
84	440.00
85	451.56
86	462.25
87	473.06
88	484.00
89	495.06
90	506.25
90.50	512
91	517.56
92	529.00
93	540.56
94	552.25
95	564.06
96	576.00
97	588.06
98	600.25
99	612.56
100	625

American Photographic Societies

This list is compiled from information received from an inquiry form sent to the societies during the latter half of 1914. It includes many societies not given in the 1914 list, but falls short of completeness as a record of the photographic societies of America. Secretaries of societies not here listed are urged to send us particulars of their organization so that the list may be fully representative of society activities.—Editor.

AKRON CAMERA CLUB—Akron, Ohio. Headquarters, Y. M. C. A. Building. Established 1890. Membership, 50. Date of meetings, second and fourth Wednesday of each month. *President,* H. A. Hoffman; *Secretary,* Louis D. Allen, 878 N. Market Street. Date of annual exhibition, February.

AMERICAN FEDERATION OF PHOTOGRAPHIC SOCIETIES—Headquarters, Toledo Museum of Art, Toledo, Ohio. *President,* John F. Jones, 723 Ash Street, Toledo, Ohio; *Vice-President,* August Smith, Toledo, Ohio; *Treasurer,* George W. Beatty; *Secretary,* C. C. Taylor, 3223 Cambridge Avenue; *Historian,* William A. Rheinheimer.

AMERICAN INSTITUTE PHOTOGRAPHIC SECTION—New York City. Headquarters, 322-324 West 23rd Street. Established March 26, 1859. Stated meetings, first and third Mondays of each month. No meetings during Summer months. *President,* Oscar G. Mason; *Vice-President,* Robert A. B. Dayton; *Treasurer,* James Y. Watkins; *Secretary,* John W. Bartlett, M.D., F.R.P.S., 149 West 94th Street.

AMERICAN LANTERN SLIDE INTERCHANGE—New York. Principal office, 361 Broadway. Organized 1885. *General Manager,* F. C. Beach. Membership, 20 clubs. *Board of Managers,* F. C. Beach, New York; H. W. Schonewolf, Buffalo, N. Y.; O. C. Reiter, Pittsburg, Pa.; Charles Townsend, Orange, N. J.; W. H. Rau, Philadelphia, Pa. Annual meeting, January of each year.

BALTIMORE CAMERA CLUB, INC.—Headquarters, 1121 Bolton Street, Baltimore, Md. Organized in April, 1912. *President,* James W. Howard; *Vice-President,* James E. Taylor; *Secretary and Treasurer,* Milton Kurtz. Meeting every Tuesday night.

BERKSHIRE CAMERA CLUB—Pittsfield, Mass. Membership, 25. Annual exhibition in May. *Secretary,* George Revilo Carter, 12 Taconic Street.

BOSTON PHOTO-CLAN—Boston, Mass. Organized July, 1911. Headquarters, The Garo Studio, 739 Boylston Street. Membership, 9. *Secretary,* Dr. Malcolm Dean Miller, 274 Beale Street, Wollaston, Mass.

BOSTON CAMERA CLUB—Boston, Mass. Established 1881. Incorporated 1886. Membership, 75. *President,* P. Hubbard; *Secretary,* John H. Thurston, 50 Bromfield Street.

BOSTON YOUNG MEN'S CHRISTIAN UNION CAMERA CLUB—Boston, Mass. Headquarters, 48 Boylston Street, Boston. Organized 1908. *President,* Dr. H. D. Hutchins; *Vice-President,* Howard I. Saunders; *Treasurer,* H. C. Channen; *Secretary,* M. L. Vincent. Meetings first Tuesday each month at club rooms, 48 Boylston Street.

BUFFALO CAMERA CLUB—Buffalo, N. Y. Headquarters, Block Building, 515 Elmwood Avenue. Annual election of officers fourth Thursday in April; regular meeting nights, second and fourth Thursdays of each month. *President,* Dr. John L. Garretson; *Vice-President,* Hugh Kerr Thomas; *Secretary,* James J. Dwyer.

CALIFORNIA CAMERA CLUB—San Francisco, Cal. Headquarters, 833 Market Street, San Francisco. Established March 18, 1890. Incorporated April 5, 1890. Membership, 370. Date of meeting, second Tuesday, monthly. Date of annual exhibition, no set time. *President,* Percy Neymann, Ph.D.; *Secretary,* Clifford B. Rushmer.

CAMERA CLUB—New York. Headquarters, 121 West 68th Street. Established by consolidation of Society of Amateur Photographers and New York Camera Club in April, 1896. Incorporated May 7, 1896. Membership, 200. Date of annual meeting, first Thursday after the first Monday in January. *Secretary,* Monroe W. Tingley.

CAMERA CLUB OF CINCINNATI—Cincinnati, Ohio. Headquarters, 7th and Walnut Streets. Established February 26, 1913. Membership, 42. Date of meetings, every Wednesday. *President,* Claude Davis Millar; *Treasurer,* Peter Scherrer; *Secretary,* Edward A. Todd.

CAMERA CLUB OF HARTFORD—Hartford, Conn. Membership, 15. *President,* Dr. Frederic S. Crossfield, 75 Pratt Street; *Vice-President,* Clayton P. Chamberlain; *Corresponding Secretary,* Eugene D. Field; *Treasurer,* A. L. Chase; *Secretary,* Mr. Charles R. Nason, 20 Madison Street.

CAMERA CLUB OF THE TWENTY-THIRD STREET BRANCH, Y. M. C. A.—New York. Headquarters, 23d Street Y. M. C. A. Established June 3, 1904. Membership, 65. Date of business meetings, second Tuesday in each month. *President,* Wm. J. Guy; *Acting Secretary,* Ernest A. Heckler, 215 West 23d Street; *Treasurer,* F. W. Grunwold. Date of annual exhibition, usually in January. No fixed date.

"CAMERADS"—New Brunswick, N. J. Headquarters, corner Church and George Streets. Established April 24, 1890. *Secretary,* Harvey Iredell, D.D.S., Lock Box 34, New Brunswick.

CAMERA CRAFT CLUB—Steubenville, Ohio. Established March 28, 1913. Regular meetings last Friday of each month. *President,* Miss Elinor J. Neidengard; *Vice-President,* Miss Margaret E. Fisher; *Secretary* and *Treasurer,* Charles E. McKee, 1011 Wilson Avenue.

CAMERA CRAFTSMEN. *Director,* Roy C. Burckes, 249 School Street, Winter Hill, Mass.

CAMERA PICTORIALISTS OF LOS ANGELES—Los Angeles, Cal. Headquarters, 758 P. E. Building. Association formed for strictly pictorial work. *Director,* Louis Fleckenstein; *Correspondent,* A. S. Little.

CAPITAL CAMERA CLUB, INC.—Washington, D. C., 712 11th Street, N. W. Founded May 1, 1891. Annual meeting third Thursday in May. *President,* T. V. Powderly; *Vice-President,* G. H. Macdonald; *Secretary,* Frank W. Vedder; *Librarian,* George F. Cranston. Date of annual exhibition, May.

CHICAGO CAMERA CLUB—Chicago, Ill. Headquarters, 329 Plymouth Court. Established February 14, 1904. Incorporated February 19, 1904. Date of meetings, every Thursday. *President,* Jos. Simons; *Vice-President,* F. T. Farrell; *Secretary,* H. P. Parker, 329 Plymouth Court.

CITY HALL CAMERA CLUB—Los Angeles, Cal. Headquarters, Room 31, City Hall. Organized May 25, 1914. Membership, 13. *Correspondent,* W. C. Sawyer.

CLEVELAND PHOTOGRAPHIC SOCIETY—Cleveland, Ohio, 402-403 Cuyahoga Building. Established June 7, 1913. Permanent organization effected at meeting of June 18. Meetings, second and fourth Wednesdays of each month. *Chairman,* Dr. H. B. Van Tress; *Secretary-Treasurer,* Geo. M. Nisbett.

COLUMBIA PHOTOGRAPHIC SOCIETY—Philadelphia, Pa. Headquarters, 2526 North Broad Street, Philadelphia. Established 1889. Incorporated July 3, 1894. Membership, 75. Date of meetings, first Monday of each month, business meeting; other Mondays, lectures or demonstrations. *President,* G. C. Bird, M.D.; *Vice-President,* Charles Prueger; *Treasurer,* C. F. Davis; *Secretary,* C. C. Whitenack, 1944 N. Camac Street.

DUNKIRK RADIO AND CAMERA CLUB—Dunkirk, N. Y. Amateur Photographers and Amateur Wireless Operators eligible. *President,* John H. Clarke; *Secretary,* Francis X. Dotterweich, 523 Dove Street.

DAGUERRE CAMERA CLUB—Headquarters, Harbert, Mich. Established 1893. Membership, 20. Date of meetings, first Monday of each month. *President,* F. Blish; *Secretary,* Wells Sizer, Harbert.

ELMIRA CAMERA CLUB—Elmira, N. Y. Headquarters, 116 Baldwin Street, Elmira. Established 1902. Membership, 37. *President,* L. E. Bishop; *Secretary-Treasurer,* Seely Stage, 706 Columbia Street.

ELYSIAN CAMERA CLUB—Hoboken, N. J. Headquarters, 307 Washington Street. Established 1902. Date of meetings, second Friday of each month. Membership, 50. *President,* Conrad R. Pedersen; *Vice-President,* Martin S. Crane; *Treasurer,* Julius Nelson; *Secretary,* Chas. Westerburg, 636 Park Avenue.

ESSEX CAMERA CLUB—Newark, N. J. Headquarters, 33 Court Street, Newark, N. J. Organized July, 1899. Membership, 80. Date of meetings, fourth Tuesday of every month. *President,* George A. Hardy; *Secretary,* L. F. Gebhardt, 233 South 11th Street. Date of annual exhibition, February.

GRAND RAPIDS CAMERA CLUB—Grand Rapids, Mich. Headquarters, 2 Central Place, N. E. Established 1899. Meetings every Thursday night from September to June. Annual exhibition in April. *President,* H. M. Long; *Vice-President,* John L. Benjamin; *Treasurer,* Harry E. Barnes; *Secretary,* Miss Harriet M. Goodrich.

INTERNATIONAL PHOTOGRAPHIC ASSOCIATION—San Francisco, Cal. Founded 1908. *President,* F. B. Hinman, Room 4, Union Depot, Denver, Colo.; *Chief Album Director,* J. H. Winchell, R. F. D. No. 2, Painesville, Ohio; *General Secretary,* Fayette J. Clute, 413-15 Call Building, San Francisco; *Stereoscopic Album Director,* James B. Warner, 413-415 Call Building, San Francisco, Cal.; *Director Post Card Division,* Charles M. Smythe, 1160 Detroit Street, Denver, Colo.; *Director Lantern Slide Division,* George E. Moulthrope, Bristol, Conn.; *Secretary Lantern Slide Division,* Edward F. Cowles, 11 Oak Street, Bristol, Conn. The *State Secretariess* Alabama—Richard Hines, Jr., 155 State Street, Mobile. Alaska—P. S. Hunt, Valdez. California—W. E. Thomson, 3211 School Street, Fruitvale, Cal. Colorado—O. E. Aultman, 106 East Main Street, Trinidad. Connecticut—George E. Moulthrope, Bristol. Florida—Capt. E. S. Coutant, Box 73, Stuart. Georgia—L. O. Surles, 231 East Pine Street, Atlanta. Idaho—Eugene Clifford, Weippe. Illinois—George A. Price, 1102 West Main Street, Urbana. Indiana—H. E. Bishop, 1704 College Avenue, Indianapolis. Iowa—C. E. Moore, Eddyville. Kansas—H. E. High, Box 72, Ellsworth. Maryland—E. G. Hopper, 218 East 20th Street, Baltimore. Massachusetts—John Mardon, 161 Summer Street, Boston. Michigan—W. E. Ziegenfuss, M.D., 327 West Hancock Avenue, Detroit. Minnesota—Leonard A. Willams, St. Cloud. Mississippi—George W. Askew, Jr., 211 34th Avenue, Meridan. Missouri—Wharton Schooler, R. F. D. No. 2, Eolia. Nebraska—Miss Lou P. Tillotson, 1305 South 32d Street, Omaha. New Hampshire—Mrs. A. Leonora Kellogg, 338 McGregor Street, Manchester. New York—Louis R. Murray, 17 Hasbrouck Street, Ogdensburg. New Jersey—Burton H. Albee, 103 Union Street, Hackensack. North Dakota—Jas. A. Van Kleeck, 619 Second Avenue, North Fargo. Ohio—J. H. Winchell, R. F. D. No. 2, Painesville. Pennsylvania—L. A. Sueary, 2822 Espy Avenue, Pittsburg. South Dakota—C. B. Bolles, L. B., 351, Aberdeen. Texas—J. B. Oheim, P. O. Drawer M, Henrietta. Utah—John C. Swenson, A.B., Provo. West Virginia—Wm. E. Monroe, Box 298, Point Pleasant.

JAMESTOWN CAMERA CLUB—Jamestown, N. Y. Established 1907. Headquarters, Chadakoin Building, Jamestown, N. Y. Membership, 18. Meetings, second Tuesday of month. *President,* C. O. Hultgren; *Vice-President,* C. Southwick; *Treasurer,* E. H. Sample; *Secretary,* L. Miller, 108 Buffalo Street.

KANSAS CITY CAMERA CLUB—Kansas City, Mo. *President,* F. L. Tyner; *Vice-President,* N. J. Simonds; *Secretary-Treasurer,* Dr. Maclay Lyon, Suite 501 Bryant Building.

LENS AND BRUSH CLUB—Northampton, Mass. Headquarters, 12 Bedford Terrace. Organized 1906. Meetings, second Thursday in month. Exhibition usually in early June. *President,* C. H. Sawyer; *Vice-President,* C. H. Howard; *Secretary,* D. C. Fitts, 12 Bedford Terrace.

LANTERN AND LENS GILD OF WOMEN PHOTOGRAPHERS—Headquarters, 10 South 18th Street, Philadelphia, Pa. Established 1909. Membership, 46. Meetings, every Wednesday. *Dean of Gild,* Miss E. W. Fisher; *Deans,* Mrs. Walter Murphy, Miss M. L. Bodine; *Steward,* Miss M. W. Little; *Clerk of Records,* Mrs. H. W. Withington; *Clerk,* Mrs. M. W. Wiltse.

LOS ANGELES CAMERA CLUB—Los Angeles, Cal. Headquarters, 3d floor, 321 South Hill Street. Meet every Thursday at 8 p. m. Organized 1908. *President,* Geo. J. Smith; *Secretary,* T. K. Adlard, 1104 West 42d Street.

MISSOURI CAMERA CLUB—St. Louis, Mo. Club Rooms, Suite No. 26 and 27, Euclid Building. Organized November, 1903. Meetings, second and fourth Tuesday. *President,* Arnold D. Alt; *Treasurer,* Chas. Lindenschmit; *Secretary,* J. P. Edsall, 4940 Washington Boulevard.

MONTREAL AMATEUR ATHLETIC ASSOCIATION CAMERA CLUB—Montreal, Canada. Headquarters, M. A. A. A. Building, 250 Peel Street. Organized May 1, 1906. *President,* B. B. Pinkerton; *Vice-President,* Chas. Adkin; *Treasurer,* R. E. Melville; *Secretary,* P. F. Calcutt, Postal Station B, Box 93.

NEWARK CAMERA CLUB—59 Mechanic Street, Newark, N. J. Organized 1888. Incorporated 1910. *President,* Alexander Berne; *Vice-President,* L. E. Wright; *Treasurer,* L. Wright, Jr.; *Secretary,* W. S. Norris, 85 Bleecker Street, Newark, N. J.

NEW BRITAIN CAMERA CLUB—Organized 1892. *President,* John A. Lewis; *Secretary,* E. A. Sheldon, 53 Lenox Place, New Britain, Conn. Meets second and fourth Tuesdays, 173 Main Street.

NEW HAVEN CAMERA CLUB—739 Chapel Street. Organized 1911. Membership, 90. *President,* E. G. Wooster; *Vice-President* John M. Walton; *Secretary,* C. M. Barber; *Treasurer,* H. D. Vincent. Meetings held every Thursday evening. Annual exhibition held at the Public Library, March or April.

ORANGE CAMERA CLUB—Orange, N. J. Headquarters, 222 Main Street. Established March 21, 1892. Incorporated May 19, 1893. Membership, 100. Date of meetings, first and third Saturdays of each month, except July, August and September. *President,* R. F. Hetherington; *Secretary,* George P. Lester, 222 Main Street, Orange, N. J.

OREGON CAMERA CLUB—Portland, Ore., 51 Washington Building. Established 1895. Incorporated 1903. Membership, 150. Date of meetings, second Tuesday in January. *President,* C. F. Richardson; *Vice-President,* J. A. Leas; *Secretary-Treasurer,* J. J. Tyrrell. Date of annual exhibition, early Spring.

PHOTOGRAPHIC CLUB OF BALTIMORE CITY—Baltimore, Md. Headquarters, Maryland Academy of Sciences Building, 105 West Franklin Street. Established 1885. Incorporated 1890. Membership, active, 71. Date of meetings, every Tuesday. *President,* Lloyd D. Norris; *Secretary,* C. C. Knobeloch, 20 N. Luzerne Avenue. Date of annual exhibition, March.

PHOTO FELLOWS OF THE WORLD—Fruitvale, Cal. *Dean,* Sigismund Blumann.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA—Philadelphia, Pa. Headquarters, 1615-1617 Sansom Street. Established November, 1862. Incorporated April 24, 1885. Membership, 130. Date of meetings: Members, 2d Wednesday; visitors, 3d Wednesday. *President,* Henry P. Baily; *Secretary,* Harold F. A. Starr, 1615 Sansom Street. Date of members' annual exhibition, February.

PHOTO-PICTORIALISTS OF BUFFALO—Buffalo, N. Y. Organized October, 1906. Membership, 8. Meetings semi-monthly. *Correspondent,* W. H. Porterfield, 100 Lakeview Avenue.

PHOTO SECESSION—New York, N. Y. Headquarters and Galleries, 291 Fifth Avenue. Continuous exhibitions November-April. *Director,* Alfred Stieglitz.

PITTSBURG ACADEMY OF SCIENCE AND ART (PHOTOGRAPHIC SECTION)—Pittsburg, Pa. Headquarters, Carnegie Institute, Schenley Park. Organized January 23, 1900. Membership, 100. Meetings, second Tuesday of each month at Club Room, 5504 Penn Avenue, and fourth Tuesday of each month at Carnegie Institute. *President,* O. C. Reiter, 2424 Penn Avenue; *Vice-President,* Rev. David R. Breed; *Secretary-Treasurer,* F. L. Miller, 1113 Penna Station; *Lantern Slide Director,* W. A. Dick, 910 Chislett Street; *Print Director,* S. A. Martin, 923 Chislett Street.

PITTSBURG CAMERA CLUB—Pittsburg, Pa. Established December, 1910. Membership, 50. *President,* Robt. L. Sleeth, Jr.; *Treasurer,* Wm. McK. Ewart, 2524 Center Avenue; *Secretary,* Charles W. Doutt, Crafton, Penna.

PORTLAND CAMERA CLUB PHOTOGRAPHIC SECTION OF THE PORTLAND SOCIETY OF ART—Portland, Me. Headquarters, L. D. M. Sweat Memorial, Spring, corner High Street. Established 1899. Membership, 90. Date of meetings, every Monday evening. *President,* Henry A. Peabody; *Vice-President,* George E. Fogg. *Secretary,* E. Roy Monroe. Date of annual exhibition, in March.

POSTAL PHOTOGRAPHIC CLUB—Headquarters, Washington, D. C. Established December, 1888. Membership, 40. Date of meetings, no regular meeting. *President,* Charles E. Fairman; *Secretary,* Gustavus A. Brandt, 631 Maryland Avenue, S. W., Washington, D. C. Albums circulate among members monthly, except August and September.

PROVIDENCE CAMERA CLUB—Providence, R. I. Established 1883. Incorporated 1889. Headquarters, Commercial Building, 55 Eddy Street. Total membership, 100. Date of meetings, second Saturday of each month. *President,* H. Ladd Walford; *Vice-President,* Ernest F. Salisbury; *Secretary,* C. W. Morrill, 55 Eddy Street; *Treasurer,* G. Frederick Bohl.

ROCHESTER CAMERA CLUB—Rochester, N. Y. Headquarters, 123 West Main Street. *Board of Trustees*—Chairman, Jas. A. Kipp; Arthur Wygant, E. Shantz, W. J. Reddin; *Secretary-Treasurer,* Edw. A. Carroll, 417 Monroe Avenue, Rochester, N. Y.

SALON CLUB—Members, 18. *Director,* W. H. Zerbe, 345 Spruce Street, Richmond Hill, L. I., N. Y.; *Secretaries,* W. and G. Parrish, 5607 Cobanne Avenue, St. Louis. Circulate monthly portfolios.

ST. LAWRENCE CAMERA CLUB—Ogdensburg, N. Y. Headquarters, 74 Caroline Street. Established 1900. Membership, 8. Date of meetings, at the call of the Secretary. *President,* Arthur L. Jameson; *Secretary,* John N. Brown, 74 Caroline Street.

TOLEDO CAMERA CLUB—Toledo, Ohio. Member of the American Federation. Headquarters, Museum of Art. Meets second Wednesday of month. *President,* John T. Murphy; *Vice-President,* Dan Dorcy; *Secretary,* Harry A. Webb, 1017 Prouty Avenue; *Treasurer,* M. W. Chapin.

TORONTO CAMERA CLUB—Toronto, Canada. In affiliation with the Royal Photographic Society of Great Britain. Established 1887. Incorporated 1893. Headquarters, 2 Gould Street. Membership, 222. Date of meetings every Monday, from October to April, inclusive. *President,* Jas. Y. S. Ross; *Secretary-Treasurer,* Edward Y. Spurr. Date of annual exhibition, March, April or May.

TRINIDAD CAMERA CLUB—Trinidad, Colo. Established April 21, 1906. Meetings second Wednesday of every month at O. E. Aultman's Studio. Monthly competitions. *President,* W. L. Crouch; *Vice-President,* J. Gysin; *Secretary* and *Treasurer, W. Dearden,* 717 Colorado Avenue.

UNION CAMERA CLUB—Boston, Mass. Headquarters, 48 Boylston Street. Meetings, first Tuesday of each month. *President,* Dr. H. D. Hutchins; *Vice-President,* H. J. Saunders; *Secretary,* M. L. Vincent; *Treasurer,* H. C. Channen.

WASHINGTON Y. M. C. A. CAMERA CLUB—Washington, D. C. Headquarters, Y. M. C. A. Building. Membership, 40. *President,* W. Springer; *Vice-President,* Chas. A. Huff; *Treasurer,* W. D. Cunningham; *Secretary,* Claude R. Breneman.

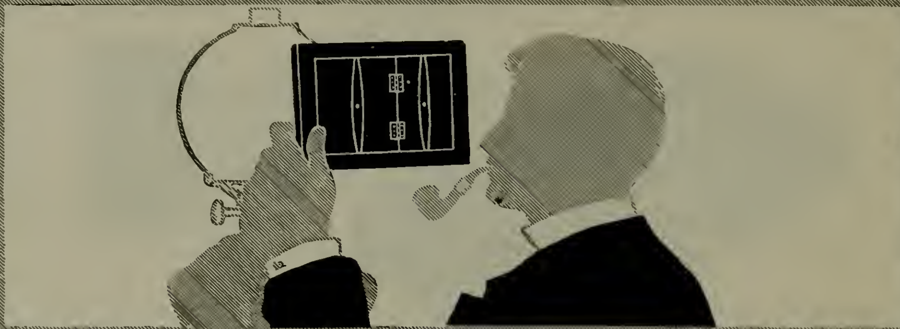
WILKES-BARRE CAMERA CLUB—Wilkes-Barre, Pa. Rooms, Poli Building, Meets every Tuesday, 8 o'clock. *President,* H. C. Shepherd; *Secretary,* J. H. Prideaux, 171 Academy Street. Exhibition annually, in the spring.

WINNIPEG CAMERA CLUB—Enderton Building Portege Avenue, Winnipeg, Manitoba, Canada. Organized February 29, 1902. Membership, 30. Meetings monthly at call of Secretary. Exhibition second week in May. *President,* W. Rowe Lewis; *Secretary,* J. M. Iredale.

YONKERS CAMERA CLUB—Yonkers, N. Y. *President,* W. R. Cronk; *Vice-President,* Geo. J. Stengel; *Secretary,* Dr. Stewart Lee Jeffrey, 274 Hawthorne Avenue.

WINTER SCENE. C. H. MAC CARY.

PORTRAIT. —*Copyright, by E. O. Hoppe.*



SEED GILT 30 EDGE PLATES

It is the consistent maintenance of Seed quality and uniformity—the superiority of Seed results—that pleases Seed customers and keeps them pleased. And there is a Seed plate for every need.

Seed 30 is the ideal plate for portraiture—is the only plate that combines extreme speed with the finest qualities of the ideal portrait plate. It has the latitude, the gradation and the fineness of grain essential to produce negatives of roundness and brilliancy, retaining the most delicate modelings of light and shade.

There are no dark days for a Seed 30.

All Dealers'.

Seed Dry Plate Division,
EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

No. 178. CIRCULAR BALUSTRADE

Finished to represent stone, adjustable (3) parts, (1) large post, (1) small post and (1) curved Balustrade section. Each piece is an accessory of itself—a general good outdoor accessory.

Price, $20.00

ROUGH & CALDWELL CO.

140th St. & Walton Ave., New York, U. S. A.

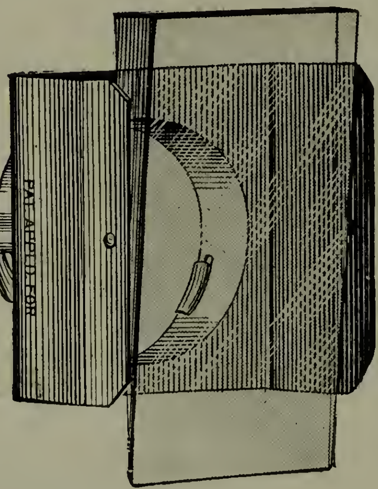
YE OLDE SEAVEY STUDIO

Funny Pictures

can be made with the

D I S T O R T O

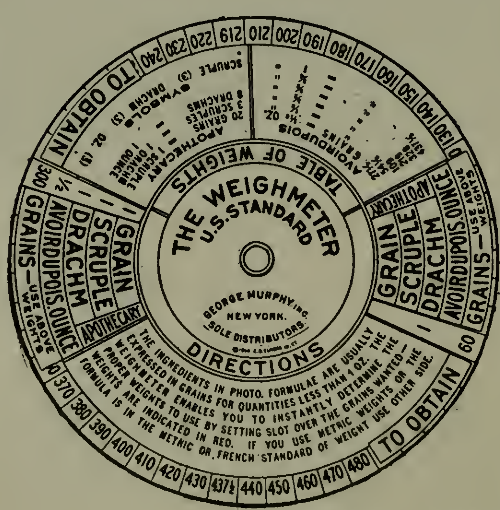
(Pat. Applied for)



A new Optical instrument, used with any ordinary camera lens, which produces any degree of Distortion in the picture. Anyone may be photographed as Tall or Short, Fat or Thin, as a Grotesque Monstrosity or artistically beautified by means of the simple use of this wonderful instrument.

The Distorto produces effects in a photograph similar to those so often seen in distorting cylindrical mirrors. Instead of being fixed in one position and of one curvature, however, as mirrors must be, the Distorto, by means of a simple adjustment, may be set to produce anything from the slightest variation to the most absurd and ridiculous extremes.

No. 1	Fits Lens of	1	to $1\frac{5}{16}$	inch diameter	$1.35	Postpaid
" 2	" " "	$1\frac{3}{8}$	" $1\frac{1}{2}$	" "	2.00	"
" 3	" " "	$1\frac{5}{8}$	" $1\frac{3}{4}$	" "	2.70	"
" 4	" " "	$1\frac{7}{8}$	" 2	" "	3.60	"
" 5	" " "	$2\frac{1}{8}$	" $2\frac{1}{2}$	" "	5.40	"



The Weighmeter

The Latest
Photographic Discovery

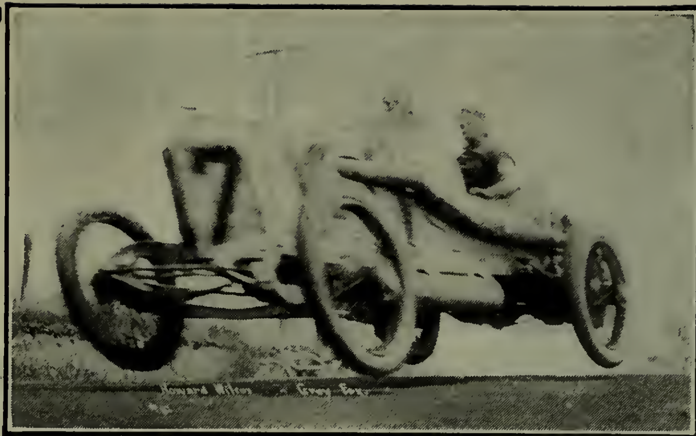
Indispensable to photographers, chemists, physicians, or anyone engaged in weighing chemicals.

The Weighmeter instantly indicates by one turn of the dial exactly what weights are to be used on the scale for any given formula. Saves time, trouble, annoyance and opportunities for errors in making the usual computations. Beautifully printed in two colors on ivory celluloid, and of just the right size to fit the vest pocket.

Price 50c., postpaid.

GEORGE MURPHY, Inc.
Retail Department
57 East 9th Street, New York

Send for Post-paid No. 14 Mail-Order Cash Catalogue



ENSIGN POPULAR REFLEX CAMERA

To the last—a clear, upright picture of just what your negative will be—a slight pressure on the release and you have it.

The Ensign Popular Reflex is a superior Reflecting Camera (size 3¼x4¼) with a choice of high grade anastigmat equipment at no greater cost than a folding camera.

Great simplicity of operation—shutter sets from one dial.

Excellent material and construction throughout; covered with seal grained, genuine morocco leather.

The Utility of the Ensign Popular Reflex is practically limitless. It equips you for **Speed, Work, Portraiture, Flashlight, etc.**

At your dealer's or sent on inspection.

Complete Outfit—Camera, 6 in. Anastigmat Lens F 4-5, and Six Plate Holders.

Price: from $57.00

G. GENNERT 24-26 E. 13 St. New York | 320 S. Wabash Ave. Chicago | 682 Mission St. San Francisco

HAUFF'S

tested through twenty years of dependable excellence and never found wanting.

No advance in list prices throughout the war.

METOL
AMIDOL
ADUROL
ORTOL
GLYCIN
HYDROKINONE

The photographer using

HAUFF'S Developers

Never has a regret—

For Plates, Papers or Films

Specify HAUFF'S

AT YOUR DEALER'S

G. GENNERT

24-26 E. 13 St. New York
320 S. Wabash Ave., Chicago
682 Mission St., San Francisco


ENSIGN FILMS
HAVE TAKEN THE WORLD
LET YOUR NEXT FILM BE AN
ENSIGN
AND SECURE THE ASSURANCE OF
ENSIGN QUALITY
DOUBLE INSTANTANEOUS-ORTHOCHROMATIC
For sale everywhere
G. GENNERT
24-26 E. 13TH ST., NEW YORK
320 S. WABASH AVE. CHICAGO
682 MISSION ST. SAN FRANCISCO